

# **SWARM STUDY FINAL REPORT ON W/B FOOTHILL FREEWAY (W/B LA-210)**

**From Vernon Avenue to Lake Avenue  
(September 25, 2001 - January 16, 2002)**



**STATE OF CALIFORNIA  
Governor Gray Davis**

**BUSINESS, TRANSPORTATION AND HOUSING AGENCY  
Secretary Maria Contreras-Sweet**

**DEPARTMENT OF TRANSPORTATION  
Director Jeff Morales**

**DISTRICT 7  
DIVISION OF OPERATIONS  
OFFICE OF FREEWAY OPERATIONS**



**October 2002**



**SWARM STUDY FINAL REPORT  
ON W/B FOOTHILL FREEWAY  
(W/B LA-210)**

**FROM VERNON AVENUE TO LAKE AVENUE  
(PM R38.87 - PM R26.14)**

**(September 25, 2001 - January 16, 2002)**

**DEPARTMENT OF TRANSPORTATION  
DISTRICT 7**

**DOUG FAILING  
DISTRICT DIRECTOR**

**FRANK QUON, DIVISION CHIEF  
DIVISION OF OPERATIONS**

**MARCO RUANO, CHIEF  
OFFICE OF FREEWAY OPERATIONS**

**AFSANEH RAZAVI, CHIEF  
RAMP METERING BRANCH**

**October 2002**

**SWARM STUDY FINAL REPORT  
ON W/B FOOTHILL FREEWAY (W/B LA-210)  
FROM VERNON AVENUE TO LAKE AVENUE  
(PM R38.87 - PM R26.14)**

**(September 25, 2001 - January 16, 2002)**

This SWARM Study Final Report has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained therein and has judged the qualifications of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.

Submitted by:

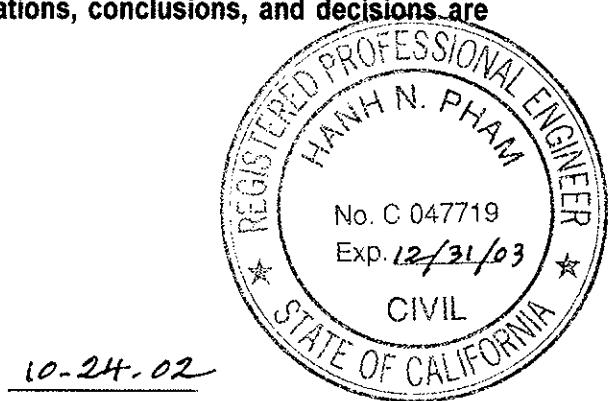
Hanh N. Pham

**HANH N. PHAM, P. E.  
Ramp Metering Branch**

Approved by:

Afsaneh M. Razavi

**AFSANEH M. RAZAVI, Chief  
Ramp Metering Branch**



10-24-02

Date



10-24-02

Date

## **ACKNOWLEDGEMENTS**

**This SWARM STUDY FINAL REPORT was prepared by:**

*TEAM LEADER:* Hanh Pham

*ASSISTANT TEAM LEADER:* Wahib Jreij

*TEAM MEMBERS:*

Chester Otani  
Hamid Kalkatechi  
Iqbal Toorawa  
Jack Kao  
Allan Dumaplin  
Reza Akramian  
Robert Masatsugu  
Rafael Benitez-Lopez  
Rody Torchin  
Tim Nguyen  
Kazem Atefyekta  
Carlos Cornejo

*With the special technical assistance of:*

Jack Smith (ITS Development)  
Dick Murphy (ITS Development)  
Jeff Aragaki (TMC)  
Nabil Eskander (TMC)  
Tadeo Lau (TMC Support)  
Alebaches Bekele (TMC Support)  
Liem Phan (TMC Support)  
Frank Lu (TMC Suport)  
Dat Ton (TMC Support)  
Kevin Lombard (TMC Support)  
Ben Banuelos (Electrical Maintenance)  
Jim Murray (Electrical Maintenance)  
Jonathan Asis  
Joseph Reynoza  
Edwin Edles

*And with the assistance for field data collection of:*

Clive Russell  
Vito Buranabul

## **TABLE OF CONTENTS**

EXECUTIVE SUMMARY.....	1
1. INTRODUCTION .....	3
2. SWARM BACKGROUND .....	5
3. SATMS 2.3 ENHANCEMENTS.....	7
4. TESTING MODES AND PROGRESSION.....	8
5. DATA ANALYSIS.....	10
6. EVALUATION.....	16
7. CONCLUSIONS.....	22
8. REMAINING SWARM ISSUES.....	23
9. RECOMMENDATIONS.....	25

## **ATTACHMENTS**

1. FIGURES
2. TABLES

## **APPENDIXES**

1. ABBREVIATIONS
2. TABLES

## **EXECUTIVE SUMMARY**

- *There are currently two most common ramp meter operations in District 7:*
  1. *Fixed-time operation,*
  2. *Local mainline responsive operation.*
- *System Wide Adaptive Ramp Metering (SWARM) is a new ramp metering system developed by National Engineering Technology (NET). Based on the entire freeway (or freeway network) real-time traffic conditions, SWARM system forecasts when and where congestion will occur. It then adjusts upstream meter rates to avoid freeway congestion.*
- *Three SWARM modes are available in District 7:*
  1. *SWARM 1 operates system wide to predict congestion,*
  2. *SWARM 2a operates locally, based on headway,*
  3. *SWARM 2b operates locally, based on storage.*

*They can be implemented individually or in combination with one another.*
- *The selected testing site was Westbound Route 210 Freeway, from Vernon Avenue (PM R38.87) to Lake Avenue (PM R26.14), which comprised 20 on-ramps.*
- *The 20 ramp metering controllers, local mainline responsive and enhanced with the new SATMS 2.3 chip, were fully compatible with SWARM system.*
- *The study included four modes of testing: SWARM 1, SWARM 2b, SWARM 1/2b modes, and a newly modified (MOD) TOD mode set up after the introduction of the SATMS 2.3 chip.*

### ***Study Conclusions:***

- *SWARM 1/2b seemed to maximize the most mainline volume, speed, and Queue Override frequency.*
- *SWARM 1/2b was the only tested mode to generate mainline speed higher than MOD TOD mode in congestion periods.*
- *SWARM 1/2b seemed to reduce the most mainline occupancy, freeway delay and travel time.*
- *SWARM 1/2b was found to be the most restrictive in regards to on-ramp metered-lane volumes.*

- MOD TOD was equivalent to SWARM 1 and SWARM 2b in some respects: mainline volume, speed, occupancy, and on-ramp (including HOV by-pass lane) volumes. However, it did not reduce travel time and on-ramp metered-lane volumes.

### **Recommendations:**

- Good quality of field equipment and communication lines is essential.
- For SWARM to operate at a maximum capacity, additional VDS should be installed at identified bottlenecks, off-ramps, collector distributor road on and off, and connectors.
- This study was focused on congestion time traffic. No study was made outside peak hour congestion period. It is suggested that some future studies be concentrated on off-peak hours to find the best-suited mode for non-congested traffic conditions.
- In the near future, an enhanced version of SATMS 2.3, called SATMS 3.0 chip, will be developed by District 7 and installed at all field controllers District wide. It is suggested that SWARM study be conducted at that time in other freeway corridors.
- Many freeways and ramps in District 7 work at full capacity. Traffic diversion to frontage roads will help avoid back up to City streets. It is suggested that local agencies be encouraged to implement better signal synchronization parallel to freeway, rather than towards the freeway.

# **1. INTRODUCTION**

Ramp metering is a freeway management technique. By regulating ramp access and controlling vehicle output onto the mainline, on-ramp metering aims to eliminate, or at least reduce operational problems resulting from freeway demand exceeding capacity. A properly implemented system improves freeway operation while causing excessive traffic to divert to the surface street network.

## **1.1 Present Ramp Metering System**

There are currently two most common ramp meter operations in District 7: fixed-time operation and local mainline responsive operation. Both operations use almost the same ramp metering equipment: inductive detector loops on mainline, queue, demand, passage and count loops on ramps, signal heads, meter-on signs, and controllers.

- Fixed-Time Operation**

Used on limited basis when mainline loops fail or during construction projects, fixed-time ramp metering is the simplest form of metering which breaks up platoons of entering vehicles onto the freeway. Although detectors are installed on the ramp to activate and terminate the metering cycle, the metering rate is fixed, based on historically averaged traffic conditions. A time of day (TOD) table in the controller sets the metering schedule and rates. Fixed-time metering reduces accidents due to merging conflicts and reduces congestion and delay on the freeway compared to no control. The primary criticism of fixed-time operation is that it is non-responsive to actual conditions, including non-recurring congestion.

- Local Mainline Responsive Operation**

Widely used in District 7, local mainline responsive ramp metering is based on traffic conditions just upstream of the on-ramp. Mainline traffic detectors are usually located adjacent to the on-ramp meter head. As in fixed-time operation, a TOD table controls the metering operation most of the time. However, if the controller detects that mainline freeway volumes have dropped below the set critical volume and critical occupancy, the controller can override the TOD tables and allow more cars on the freeway up to the point of turning the meter to rest in green. The actual numbers would be calculated by the controller and would be dependent on how far the freeway volumes are below the set critical volume. The controller can never allow fewer vehicles on the freeway than the rate set in the TOD table. Queue detectors are placed at the entrance of the ramp near city streets. If the queue detectors are activated, the controller will allow more vehicles onto the freeway when ramp storage approaches capacity in order to prevent back up onto city streets. The primary criticism of local mainline responsive operation is that it reacts only to traffic adjacent to the ramp and does not consider what is happening on the rest of the freeway system.

## **1.2 Purpose of SWARM Testing**

System Wide Adaptive Ramp Metering (SWARM) is a new ramp metering tool developed by National Engineering Technology (NET). SWARM system looks at the entire freeway system and predicts when and where congestion will occur. It then adjusts upstream meter rates to avoid freeway congestion. SWARM was previously tested by District 12 (Orange County). However, the current SWARM tested by District 7 is a modified version of the one tested in District 12.

SWARM needs to be tested to confirm that it works. If it does work, SWARM might represent a good alternative to the existing ramp meter operations.

## **1.3 Test Location**

The selected site for the Final SWARM Study was the same as in the previous test: westbound Route 210 Freeway, from Vernon Avenue (PM R38.87) to Lake Avenue (PM R26.14), which comprised 20 on-ramps. See Fig. 1.1 (Test Location), Fig. 1.2 (Testing Corridor), and Fig. 1.3 (Testing Corridor Geometrics).

The study covered the AM peak period from 5:30 AM to 10:00 AM. It started on Tuesday, September 25, 2001, and ended on Wednesday January 16, 2002. However, the study used only traffic data comprised between 6:00 AM and 9:00 AM.

All 20 ramp controllers on Freeway testing corridor were local mainline responsive.

## **1.4 Enhancement of the Metering Controllers**

As indicated in the Preliminary SWARM Study Report, the original ramp metering system and SWARM were not fully compatible. Therefore, the need for enhancements to both systems was evident following the previous study. In April 2001, the Office of TMC Support developed a new chip, SATMS 2.3. In July and August 2001, SATMS 2.3 was installed in the 20 controllers of the SWARM testing corridor. Enhanced with a new chip, the ramp meter controllers on the testing corridor were made fully compatible with SWARM system. They would help explore few SWARM features that the previous 2 chips SATMS 1.0 and SATMS C could not.

Before testing SWARM, the Time of Day (TOD) tables at the 20 on-ramps were revised based on the enhancements of the new SATMS 2.3 chip. The revised or modified (MOD) TOD tables were implemented in September 2001 in order to improve mainline traffic.

## **2. SWARM BACKGROUND**

There are various types of ramp metering methodologies being used to control on-ramp vehicle output onto the mainline. SWARM testing in District 7 is intended to explore an alternative upgrade to the existing system.

### **2.1 SWARM – System Wide Adaptive Ramp Metering**

SWARM is a new ramp metering operational system that develops metering rates based on real time traffic conditions. It looks at the complete freeway system and forecasts traffic conditions at bottlenecks  $n$  minutes into the future. SWARM will change metering rates upstream of bottlenecks to avoid predicted future traffic congestion.

In order for SWARM to work properly, most or preferably all ramp control and traffic surveillance devices must be operational and connected to a central computer. In District 7, the Advanced Transportation Management System (ATMS) is connected to field controllers at most freeway on-ramps. Data from the mainline and on/off ramps is fed into the central computer.

SWARM seeks to optimize traffic flow on the mainline and is responsive to actual conditions throughout the system and to non-recurring congestion.

### **2.2 SWARM Modes**

There are three SWARM modes: SWARM 1 operates system wide to predict congestion, SWARM 2a and SWARM 2b operate locally and are based on headway and storage respectively.

- SWARM 1**

SWARM 1 is system wide adaptive based on a freeway network divided into SWARM sections. Each section begins and ends at a mainline vehicle detection station (VDS) identified as a bottleneck. The SWARM 1 algorithm operates at bottleneck locations and controls the flow of all upstream locations in the section.

Since density is directly related to congestion, it is monitored at each bottleneck location. The algorithm requires a nominal saturation density threshold value for each mainline VDS in the network.

The algorithm attempts to estimate the density  $n$  minutes in the future. If the estimated density exceeds the bottleneck saturation density then ramp meter rates will be computed in an attempt to head off the predicted onset of congestion.

Starting at the bottleneck and working upstream, the computer calculates new metering rates based on current ramp volumes and the required volume reductions.

Actual metering rates are subject to maximum and minimum rates. Since reductions may be positive or negative, excess or surplus values are propagated upstream.

- **SWARM 2a**

SWARM 2a is local responsive based on headway (time between consecutive vehicles). It uses density function to compute local metering rates and attempts to maintain headway such that maximum flow can be obtained.

- **SWARM 2b**

SWARM 2b is local responsive based on storage. It computes the number of vehicles stored between two VDS stations and compares it to a maximum storage value. Metering rates are computed to maintain level of service (LOS) D as long as possible.

This SWARM study will cover SWARM 1, SWARM 2b and combination of SWARM 1 and SWARM 2b, called SWARM 1/2b.

### **2.3 Advantages of SWARM:**

- It is aimed towards maximizing traffic flow on the mainline.
- It is responsive to actual traffic conditions throughout the system.
- It is responsive to non-recurring congestion.

### **2.4 Disadvantages of SWARM:**

- Ramp control and traffic surveillance devices must be connected to a computerized communications center.
- Communication lines must be maintained at all times to ensure data exchange between TMC and field controllers.
- It requires accurate data from mainline and on- and off-ramp detectors in order to work effectively.
- It is more complicated than local mainline responsive and fixed-time metering.

### **3. SATMS 2.3 ENHANCEMENTS**

The new SATMS 2.3 chip provides the following SWARM related enhancements:

1. Queue Override mode created to speed up the metering rate when vehicle's back up reaches the entrance of the on-ramp can be used with SWARM mode. If activated, in case of a ramp back up, the Queue Override mode will gradually increase the metering rate dictated by SWARM up to a maximum rate of 15 vehicles/minute/lane (vpmpl). Therefore, Queue Override mode will reduce the overflow of vehicles onto city streets.
2. The loss of communication cycle time is increased from one cycle (approximately 30 seconds) to ten cycles or around 5 minutes in order to minimize frequent changes between SWARM and local TOD mode. Thus, communication losses lasting no more than ten cycles would not affect the implementation of SWARM rate in the field: the controller would meter, for up to 5 minutes, according to the last SWARM rate before communication failure occurred.
3. Whenever metering is initiated or terminated by SWARM or loss of communication cycle time exceeds 10 cycles, the controller will apply one minute Green Ball at the beginning and end of each metering phase.
4. Speed up the controller 170 initiation reset time after a power failure, which reduces the watchdog black out problem. Therefore, variation or brief interruption in power voltage level will have less effect on the operation of the ramp meter.

The above listed enhancements are viewed as major improvements in order to address the adverse effect to SWARM implementation, due to multiple issues which were experienced during the Preliminary SWARM testing: mainly frequent and brief losses of communication and on-ramp back up onto city streets.

## **4. TESTING MODES AND PROGRESSION**

The SWARM study included four modes of testing: MOD TOD, SWARM 1, SWARM 2b, and SWARM 1/2b (See Table 4.1, SWARM Test Schedule). These four separate modes were compared against the Pre-study or original (OR) TOD mode of the Preliminary SWARM testing in order to capture the effect of the changes brought about by the installation of the new SATMS 2.3 chip. As set in the Preliminary phase of SWARM testing, ramp meter rate is supposed to increase or decrease smoothly by limited increments according to Table 4.2, Rate and Cycle Length Variations.

### **4.1 MOD TOD (09/25/01 to 10/04/01 and 01/16/02)**

This phase consists of a revised or modified TOD implemented at all 20 on-ramps throughout the testing corridor. This MOD TOD took effect after the installation of the new SATMS 2.3 chip. It is aimed to improve mainline flow by applying more restrictive metering rates. It also accommodates a gradual decrease in metering cycle, from programmed TOD to a minimum of four-second cycle, when Queue Override mode is activated. Please note that OR TOD mode accommodated a one step decrease in cycle length from programmed TOD to the minimum four-second cycle.

The metering period assigned to the MOD TOD is 4.5 hours long, from 5:30 AM to 10:00 AM. This MOD TOD is a replacement to the old OR TOD and it took effect on the testing corridor immediately after the installation of the new SATMS 2.3 chip, in mid-August 2001. Manual Queue counts were performed on 01/16/02 on on-ramps experiencing the most traffic back up onto city streets. These counts are intended to help evaluate the effect of the Queue Override mode on city streets and mainline.

### **4.2 SWARM 1 (10/16/01 and 10/23/01)**

SWARM 1 mode was tested for 2 days 10/16/01 and 10/23/01. The testing was performed both days with Queue Override mode activated. Traffic data and reports were collected for both days. However, based on field observation and on-ramp mode of operation reports, which were generated on the first day of testing, a list of on-ramps experiencing traffic back up onto city streets was established. Based on the list, manual Queue counts were performed at most affected locations on the 2<sup>nd</sup> day of testing.

### **4.3 SWARM 2b (10/17/01 and 10/24/01)**

SWARM 2b mode was tested for 2 days 10/17/01 and 10/24/01. Similarly to SWARM 1, the 2<sup>nd</sup> day of testing was characterized by the addition of the manual Queue counts at on-ramps with most traffic back up onto city streets.

#### **4.4 SWARM 1/2b (10/18/01 and 11/07/01)**

SWARM 1/2b mode was tested for 2 days 10/18/01 and 11/07/01. Manual Queue counts were also performed on the 2<sup>nd</sup> day of testing at on-ramps locations affected most by traffic back up onto city streets.

## **5. DATA ANALYSIS**

The collected data comprise those generated by:

- MOD TOD mode, during 6 days: 09/25/01, 09/26/01, 09/27/01, 10/02/01, 10/03/01, and 10/04/01,
- Three SWARM modes: SWARM 1 during 2 days: 10/16/01 and 10/23/01, SWARM 2b during 2 days 10/17/01 and 10/24/01, and SWARM 1/2b during 2 days 10/18/01 and 11/07/01.

These data are studied and compared with those generated by OR TOD mode during 9 days: 10/24/00, 10/25/00, 10/31/00, 11/01/00, 11/07/00, 11/14/00, 12/05/00, 12/07/00, and 12/12/00. See Tables A5.1.1a to A5.1.20d in Appendixes.

Different aspects of traffic congestion are studied on mainline and on-ramps as well.

### **5.1 Mainline Volume**

The mainline volumes generated by the four new modes: MOD TOD, SWARM 1, SWARM 2b and SWARM 1/2b, were roughly close to the volumes generated by OR TOD mode (see Tables 5.1a1 and 5.1a2, Mainline Volumes from 6:00 AM to 9:00 AM).

Fig 5.1 and Table 5.1b, Average Mainline Volumes from 6:00 AM to 9:00 AM, show that:

- OR TOD mode average volumes varied from a minimum of 14,723 at Mount Olive to a maximum of 29,799 at Lake.
- MOD TOD mode average volumes were also at minimum at Mount Olive and at maximum at Lake. It was noted that the average volumes at 15 stations were lower by 2% to 8% when compared with the OR TOD average volumes. The average volumes were only higher at 2 stations: by 4% at Hill, and 12% at Michillinda.
- SWARM 1 mode average volumes had also a minimum value at Mount Olive and a maximum value at Lake. Out of 20 stations, 12 had average volumes lower than their respective OR TOD mode values from 1% to 15%, 6 stations had their average volumes higher than their OR TOD mode values from 1% to 11%.
- SWARM 2b mode average volumes had a variation pattern similar to that of MOD TOD mode and SWARM 1 mode. Only 3 stations showed an average volume larger than those in OR TOD mode: Santa Anita 1, Michillinda, and Hill (from 1% to 10%).

- SWARM 1/2b mode experienced a general improvement in average volume compared with OR TOD mode: 12 out of 20 stations had their average volumes increased from 1% to 14%.

## **5.2 Mainline Speed**

Mainline speeds recorded between 6:00 AM and 9:00 AM for MOD TOD and 3 SWARM modes were generally higher than the speeds recorded for OR TOD mode. (See Tables 5.2a1 and 5.2a2, Mainline Speed from 6:00 AM to 9:00 AM).

Fig.5.2a and Table 5.2b, Average Mainline Speed from 6:00 AM to 9:00 AM, show an improvement of mainline speed in all 4 new modes.

- MOD TOD mode had 13 stations where mainline speeds increased from 2% to 42% compared with OR TOD mode speed.
- SWARM 1 mode found that 14 out of 20 stations had their average speed higher than their OR TOD mode counterparts from 1% to 45%.
- SWARM 2b mode had also 12 stations with higher average speed compared to OR TOD mode respective values. The increase varied from 4% to 44%.
- SWARM 1/2b mode experienced 14 stations with average speed higher than the average of OR TOD mode. The increase varied from 1% to 45%.

Analyzing mainline speed for a 15 minute interval during morning congestion period, from 7:30 AM to 7:45 AM (Table 5.2.c1 and 5.2.c2, Mainline Speed from 7:30 AM to 7:45 AM, and Fig. 5.2b and Table 5.2d, Average Mainline Speed from 7:30 AM to 7:45 AM) showed that all 4 tested modes had 11 to 15 stations out of 20 with higher average speed when compared to OR TOD mode values:

- MOD TOD mode had 12 stations of higher average speed, the maximum increase was 43% at Hill.
- SWARM 1 mode showed 14 stations with higher average speed, the increase was at maximum at Hill (52%).
- SWARM 2b mode had only 11 stations with higher average speed, the largest increase was only 29% at Hill.
- SWARM 1/2b mode had 15 stations with increased average speed, the highest increase was at Vernon (60%) and Hill (52%).

### **5.3 Mainline Occupancy**

Tables 5.3a1 and 5.3a2, Mainline Occupancy from 6:00 AM to 9:00 AM, present a consistent variation of occupancy at each station, with one exception of an isolated low value at Rosemead 2 of 12/12/00 (4.5%). This exception might be related to the fact that only 2 out of 4 mainline loops are operating at this location.

Fig. 5.3 and Table 5.3b, Average Mainline Occupancy from 6:00 AM to 9:00 AM, show a reduction in mainline occupancy in all four tested modes over OR TOD mode. However, 5 to 7 stations showed a slight increase in average occupancy (from 2% to 19%).

### **5.4 Freeway Delay**

ATMS data during the testing period were not always available for all 20 stations. Due to occasional communication failure to/from TMC or hard failed loop sensors at one or more stations, freeway delay data were missing for one or more stations of the testing corridor.

During the testing period, 7 stations were found with incomplete freeway delay data for one or more SWARM modes and for MOD TOD mode. They were: Sierra Madre Villa, Rosemead 2, Michillinda, Baldwin1, Baldwin 2, Mountain, and Buena Vista. The data related to these stations was discarded from the total freeway delay for each testing day and each mode.

Comparing the freeway delay average values of the 4 tested modes with the average values of OR TOD mode, it was found that SWARM 1/2b mode had the smallest value: 83% of OR TOD mode value, next was SWARM 1 mode (85%). While MOD TOD mode yielded a 96% of OR TOD mode value, SWARM 2b had a freeway delay equivalent to OR TOD mode value. See Table 5.4, Freeway Delay from Vernon to Lake from 6:00 AM to 9:00 AM.

### **5.5 Mode of Operation**

Tables 5.5a1 and 5.5a2, Mode of Operation (%) from 6:00AM to 9:00 AM, show that only some controllers worked full time (100%) under OR TOD mode. However, these Tables show that no controller could stay more than 99.7% of the time under other assigned modes.

In case of communication failure, ramp controllers under SWARM mode are programmed to switch back to the existing MOD TOD mode if the failure last for more than 10 cycles or approximately 5 minutes. If the communication loss is less than 10 cycles, field controllers continue to meter according to the SWARM rate immediately before the communication failure.

If a ramp controller operating on MOD TOD mode experiences a loss of communication, the controller will stay the same way of operation as before the failure. However, the Mode of Operation Report will show a time percentage less than 100%, while a certain percentage will be attributed to an unknown mode.

As stated before in this Report, the installation of the new SATMS 2.3 chip will enable Queue loop to activate Override mode when the ramp queue backs up onto city streets. QO percentage is a direct indicator of how often the ramp is jammed during the metering period. A ramp will have a larger QO value when a more restrictive mode is assigned.

Tables 5.5b1 and 5.5b2, Queue Override (QO) from 6:00 AM to 9:00 AM, show that QO percentage was highest at SWARM 1/2b mode (45% at Hill on 11/07/01, 41.4% at Lake on 10/18/01). SWARM 2b mode had a QO of 32.5% at Myrtle on 10/24/01 and 29.7% at Huntington on 10/17/01. SWARM 1 mode had a few QO values of 20% to 29%, while MOD TOD mode had QO values lower than 25%.

The extent of QO mode is more pronounced by Fig. 5.5 and Table 5.5c, Average QO from 6:00 AM to 9:00 AM. MOD TOD mode had 3 ramp controllers with an average QO from 12 to 23 times the average of the OR TOD values. The three SWARM modes experienced an average QO values more than 100 times higher than their respective OR TOD values, especially SWARM 1/2b, where the average QO value at Irwindale 1 was 304 times larger than OR TOD mode value.

## **5.6 Travel Time**

The reconstituted travel time was calculated in Tables A5.6.1 to A5.6.21, Travel Time, in Appendixes, for every testing day with the vehicle starting at Vernon at 7:30 AM.

The method of travel time calculation is the same as in the Preliminary Study: the distance between 2 consecutive stations is the difference of their Post Miles, the speed used for travel time between 2 consecutive stations is the average of the speeds at these stations. In case of unavailable speed data at one station, the missing speed will be replaced with the average of the speeds at its 2 closest stations.

The reconstituted travel times for all modes are shown in Table 5.6, Travel Time from Vernon to Lake.

- OR TOD travel time varies largely from 28.65 minutes to 41.10 minutes, with an average of 36.41 minutes.
- MOD TOD travel time is in the same order as that of OR TOD mode. The average value is 37.17 minutes, 2% higher than the average in OR TOD mode.
- SWARM 1 mode experienced an average travel time of 34.97 minutes, 4% lower than the average in OR TOD mode.

- SWARM 2b mode had an average travel time of 34.89 minutes, slightly smaller than the average in the SWARM 1 mode.
- SWARM 1/2b mode had the smallest average travel time, 31.48 minutes, 14 % lower than OR TOD mode value.

## **5.7 On-Ramp Volumes**

Except for Sierra Madre Villa as a two-to-one lane metered on-ramp, 19 other ramps have 2 lanes: 6 ramps with both lanes metered, and 13 ramps with one metered lane and one HOV by-pass lane.

Table 5.7a1 and 5.7a2, On-Ramp Volumes from 6:00 AM to 9:00 AM, show that the on-ramp volumes varied largely from one ramp to another, not only because of the number of lanes, but also because of their respective locations.

Fig. 5.7a and Table 5.7b, Average On-Ramp Volumes from 6:00 AM to 9:00 AM, show that:

- Average volumes at each on-ramp varied consistently enough throughout the 4 studied modes. At Lake, San Gabriel, Michillinda, Huntington, and Mountain, the average on-ramp volumes in all 3 SWARM modes and MOD TOD mode were lower than the average volumes in OR TOD mode. At Rosemead 1, Santa Anita 2, Buena Vista, Mount Olive, and Vernon, these averages were higher than their respective values in OR TOD mode.
- 7 to 9 on-ramps had their average volumes higher than OR TOD mode values.
- 5 to 7 ramps had their average volumes lower than OR TOD mode values.
- At Santa Anita 2, the average volumes in 4 studied modes were 11% to 12% higher than OR TOD mode values.
- At Rosemead 1, MOD TOD mode experienced an increase of 29% when compared to OR TOD mode, SWARM 1 generated an increase of 31%, SWARM 2b, 50%, and SWARM 1/2b, 55%.

As already stated in the Preliminary Report, large variations of on-ramp volumes cannot be solely attributed to implemented MOD TOD or SWARM modes. Of the 20 on-ramps on the study corridor, 13 included an HOV by-pass lane, where freeway access is not restricted by any metering mode.

Analyzing on-ramp volumes on metered lanes only (Tables 5.7c1 and 5.7c2, On-Ramp Metered Lane Volumes from 6:00 AM to 9:00 AM, and Fig. 5.7b and Table 5.7d, On-

Ramp Metered Lane Average Volumes from 6:00 AM to 9:00 AM) showed that MOD TOD mode and all 3 SWARM modes generally allowed fewer vehicles to enter the mainline than OR TOD mode:

- MOD TOD mode reduced the metered lane volumes at 12 out of 17 ramps by 1% to 46% when compared to OR TOD mode. 5 ramps had their metered lane inputs increased by 1% to 62%.
- SWARM 1 mode reduced metered lane inputs by 2% to 50% at 13 out of 18 ramps. 5 ramps saw their values increased by 5 % to 58%.
- SWARM 2b mode lessened the volumes by 2% to 48% at 14 out of 18 ramps. Only 4 ramps had higher values than OR TOD mode by 1% to 62%.
- SWARM 1/2b mode saw 12 out of 17 ramps with metered lane inputs diminished by 1% to 46%. 4 ramps had their volumes increased by 7% to 59%. Only one ramp (Baldwin 2) allowed the same metered lane volume as in OR TOD mode.

## **5.8 On-Ramp Queue Lengths**

Manual Queue counts were performed at 9 ramps considered as the busiest out of the 20, based on the Mode of Operation Report. Table 5.8, On-Ramp Queue Counts shows that:

- In MOD TOD mode, 7 out of 9 ramps had longer queues than in OR TOD mode.
- In SWARM 1 mode, only 4 ramps had longer queues than in OR TOD mode.
- In SWARM 2b mode, 5 out of 9 ramps had longer queues than in OR TOD mode.
- In SWARM 1/2b mode, 8 out of 9 ramps had longer queues than in OR TOD mode.

## **6. EVALUATION**

In the previous section, MOD TOD and three SWARM modes were analyzed based on OR TOD in effect before the introduction of SATMS 2.3. MOD TOD and the three SWARM modes can be evaluated separately in comparison with OR TOD.

### **6.1 MOD TOD**

The new SATMS 2.3 chip brought up changes in MOD TOD mode. Comparing the performance of TOD modes using SATMS 1.0 or SATMS C in the Preliminary testing phase and SATMS 2.3 in the final testing phase, in terms of traffic elements:

- Mainline Volume: MOD TOD decreased OR TOD volume by 3%.
- Mainline Speed from 6:00 AM to 9:00 AM: MOD TOD increased the OR TOD mainline average speed by 8%.
- Mainline Speed from 7:30 AM to 7:45 AM: MOD TOD also increased the OR TOD mainline speed by 8%.
- Mainline Occupancy: MOD TOD decreased the OR TOD occupancy by 9%.
- Freeway Delay: MOD TOD decreased the OR TOD freeway delay by 4%.
- Queue Override: MOD TOD experienced almost 5 times (497%) more Queue Override than OR TOD.
- Travel Time: MOD TOD increased the OR TOD travel time by 2%.
- On-Ramp Volumes, including HOV by-pass lane: MOD TOD increased the OR TOD average values by 2%.
- On-Ramp Volumes, metered lane only: MOD TOD decreased the OR TOD metered lane average volumes by 2%.
- On-Ramp Queue Lengths: MOD TOD increased OR TOD values by 20%.

### **6.2 SWARM Modes**

SWARM modes performance can be evaluated by comparing them to OR TOD and MOD TOD modes.

### **6.2.1 Comparison to OR TOD**

#### **Mainline Volume**

- SWARM 1 slightly decreased the mainline volume by 1%,
- SWARM 2b decreased it by 3%,
- SWARM 1/2b gave a small increase of 1%.

#### **Mainline Speed**

All three SWARM modes generated a net improvement to mainline speed during the morning period from 6:00 AM to 9:00 AM.

- SWARM 1 increased the mainline speed by 9%,
- SWARM 2b showed an improvement of 7%,
- SWARM 1/2b increased the mainline speed by 11%.

The speed improvement was more accentuated during the morning congestion time (7:30 AM to 7:45 AM) over the OR TOD:

- SWARM 1 showed an improvement of 7%,
- SWARM 2b increased the mainline speed by 4%,
- SWARM 1/2b excelled with an increase of 23% to the mainline speed.

#### **Mainline Occupancy**

Mainline occupancy was reduced in all three SWARM modes:

- SWARM 1 reduced it by 10%,
- SWARM 2b reduced by 9%,
- SWARM 1/2b reduced it the most, by 13%.

#### **Freeway Delay**

The freeway delay was also reduced in all three SWARM modes:

- SWARM 1 mode reduced it by 15%,

- SWARM 2b reduced it by 1%,
- SWARM 1/2b reduced it by 17%.

### **Queue Override**

This feature was not studied in the Preliminary testing phase.

- SWARM 1 had a QO frequency of approximately 33 times the OR TOD mode QO frequency,
- SWARM 2b had more than 28 times QO frequency,
- SWARM 1/2b experienced the highest QO frequency: more than 68 times, or more than the QO of 2 other SWARM modes put together.

It is noted that the latter mode is the combination of the two other SWARM modes.

### **Travel Time**

As expected, the travel time was reduced by SWARM modes:

- SWARM 1 reduced the travel time by 4%,
- SWARM 2b also reduced it by 4%,
- SWARM 1/2b had the largest reduction: 14%.

### **On-Ramp Volumes**

With HOV by-pass lane volumes taken into account:

- SWARM 1 reduced on-ramp volume by 4%,
- SWARM 2b reduced on-ramp volume by 3%,
- SWARM 1/2b generated a reduction of 5%.

In regards to on-ramp metered lane volumes only, the three SWARM modes became more restrictive:

- SWARM 1 reduced the volume by 8%,
- SWARM 2b decreased it by 7%,

- SWARM 1/2b reduced it by 9%.

### **On-Ramp Queue Lengths**

Since the counts were performed at 9 out of 20 on-ramps, it was hard to generalize the results to all the ramps. However, the 9 selected ramps were considered as the busiest ones.

- SWARM 1 generated queues 10% longer than those observed in OR TOD mode,
- SWARM 2b experienced queues 48 % longer,
- SWARM 1/2b originated queues 41% longer.

The results are summarized in Table 6.1, Comparison of SWARM Modes to Original TOD Mode (%).

### **6.2.2 Comparison to MOD TOD**

Performance of SWARM modes can also be evaluated based on MOD TOD mode.

#### **Mainline Volume**

- SWARM 1 increased the MOD TOD mode mainline volume by 2%,
- SWARM 2b maintained the same volume as MOD TOD mode,
- SWARM 1/2b gave a highest increase (4%).

#### **Mainline Speed**

During the morning period from 6:00 AM to 9:00 AM, when compared to MOD TOD mainline speed:

- SWARM 1 did not improve the mainline speed.
- SWARM 2b decreased it by 1%,
- SWARM 1/2b increased it by 3%.

SWARM impact was more pronounced during the morning high congestion time (7:30 AM to 7:45 AM):

- SWARM 1 showed a decrease of mainline speed by 1%,

- SWARM 2b decreased it by 4%,
- SWARM 1/2b excelled with an increase of 14% of the mainline speed.

### **Mainline Occupancy**

Mainline occupancy was not increased in all three SWARM modes:

- SWARM 1 decreased it by 2%,
- SWARM 2b gave the same occupancy,
- SWARM 1/2b reduced it the most, by 5%.

### **Freeway Delay**

Freeway delay was not always reduced in SWARM modes:

- SWARM 1 reduced it by 14%,
- SWARM 2b increased it slightly (by 3%),
- SWARM 1/2b excelled with a reduction of 16% of MOD TOD mode freeway delay.

### **Queue Override**

- SWARM 1 had a QO frequency of approximately 5.5 times MOD TOD mode frequency,
- SWARM 2b had 4.8 times,
- SWARM 1/2b experienced the highest QO frequency: more than 11 times.

### **Travel Time**

As expected, the travel time was reduced by SWARM modes:

- SWARM 1 reduced the MOD TOD mode travel time by 6%,
- SWARM 2b also reduced it by 6%,
- SWARM 1/2b had the largest reduction: 16%.

## **On-Ramp Volumes**

The three studied modes decreased slightly on-ramp volumes (including HOV by-pass lane volumes):

- SWARM 1 reduced them by 1%,
- SWARM 2b maintained ramp volumes in the same order as MOD TOD mode,
- SWARM 1/2b was the most restrictive when it came to freeway access: volumes were reduced by 2%.

In regards to on-ramp metered lane volumes only:

- SWARM 1 reduced the volumes by 5%,
- SWARM 2b also decreased them by 5%,
- SWARM 1/2b reduced them by 6%.

## **On-Ramp Queue Lengths**

Based on the 9 selected ramps considered as the busiest ones:

- SWARM 1 generated queues 9% shorter than those of MOD TOD mode,
- SWARM 2b registered queues 23 % longer,
- SWARM 1/2b experienced queues 18% longer.

The results are summarized in Table 6.2, Comparison of SWARM Modes to Modified TOD Mode (%).

## **7. CONCLUSIONS**

The SWARM Study examined not only the three SWARM modes, but also the Modified TOD mode, in effect after SATMS 2.3 was installed at 20 ramps controllers. Through 6 days of MOD TOD testing and 6 days of SWARM testing under actual field conditions, the following conclusions were drawn:

1. When using the SATMS 2.3 chip, among the three tested SWARM modes, SWARM 1/2b seemed to maximize the most mainline volume, speed, and Queue Override frequency.
2. SWARM 1/2b was the only tested mode to generate mainline speed higher than Modified TOD mode in congestion period.
3. SWARM 1/2b seemed to reduce the most mainline occupancy, freeway delay and travel time.
4. SWARM 1/2b was found to be the most restrictive in regards to on-ramp metered-lane volumes.
5. MOD TOD was equivalent to SWARM 1 and SWARM 2b in some respects: mainline volume, speed, occupancy, and on-ramp (with HOV by-pass lane) volumes. However, it did not reduce travel time and on-ramp metered lane volumes.

## **8. REMAINING SWARM ISSUES**

Installation of the new SATMS 2.3 chip has enhanced few SWARM features. Following are observations regarding these features:

### **8.1 SWARM 1/2b Case**

When SWARM 1/2b was implemented, in most cases, it generated the most restrictive rate in comparison to SWARM 1 and SWARM 2b. This was the case at 6:57:30 AM on 10/18/01 at Vernon on-ramp, where SWARM 1 generated a minimum rate of 5 vpm, and SWARM 2b generated a Green Ball. See Table 8.1a, Metering Rate Statistics at Vernon.

However, it was not always the case.

At Altadena, the metering rate was the maximum between those generated by SWARM 1 and SWARM 2b. See Table 8.1b, Metering Rate Statistics at Altadena.

It happened also that SWARM 1/2b engendered a rate higher than those generated by SWARM 1 and SWARM 2b individually. See Table 8.1c, Metering Rate Statistics at Irwindale NB.

The above showed that SWARM 1/2b did not always generate the most restrictive rates as it was supposed to.

### **8.2 Smoothing Trend Inconsistency**

Alike SWARM 1 in the Preliminary Study, the rate variation was noted to be out of range from Table 4.2, Rate and Cycle Length Variations.

- On 10/16/01, at 7:21:30 AM, at San Gabriel on-ramp, the rate decreased suddenly from 15 vpm to 8 vpm. See Table 8.2a, Ramp Metering Report.
- At 7:00:30 AM on 10/17/01, at San Gabriel on-ramp, SWARM 2b rate jumped from 9 vpm to 15 vpm, which is more than the increase limit (12 vpm). See Table 8.2b, Ramp Metering Report.
- A similar sudden rate change was also observed at San Gabriel with SWARM 1/2b on 11/07/01 at 8:02:30AM (from 15 to 8). See Table 8.2c, Ramp Metering Report.

### **8.3 Metering Rate Inconsistency**

At times, SWARM operated the system in an inconsistent manner as how the ramp meter system should have been operating.

- At 8:29:30 AM on 10/16/01, while Mount Olive and Buena Vista experienced a congestion (mainline speeds were 6.3 mph and 8.2 mph respectively), SWARM 1 generated a rate of 6 vpmpl at Mount Olive on-ramp, and a maximum rate (15 vpmpl) at Buena Vista on-ramp. See Tables 8.3a1 and 8.3a2.
- The same inconsistency was repeated at 9:14:30 AM on 10/23/01 at the same locations with SWARM 1. See Table 8.3b1 and 8.3b2.
- At 7:45 AM on 10/16/01, when the freeway section from Mountain to Santa Anita SB was congested (mainline speeds recorded at 5 VDS were under 30 mph), SWARM 1 assigned a maximum rate (15 vpmpl) to Santa Anita NB and Huntington on-ramps. See Tables 8.3.c1 and 8.3.c2.
- At 6:14:30 AM on 11/07/01, while the mainline from San Gabriel to Lake was free flow (speed above 55 mph), and San Gabriel on-ramp recorded a maximum rate of 15 vpmpl, SWARM 1/2b assigned a minimum rate of 5 vpmpl to Altadena, Hill and Lake on-ramps. See Tables 8.3.d1 and 8.3.d2.

#### **8.4 Changing to/from SWARM Modes**

Changing from one mode to another (from TOD mode to SWARM modes, from a SWARM mode to another, or from a SWARM mode to TOD mode) was done manually for each on-ramp during the test duration. The manual change in the TMC is not only time-consuming (an on-ramp needs about 2 minutes to change from one mode to another), but also subject to errors (an on-ramp can be skipped mistakenly and remains in an undesirable mode during the test). The mode change should be done systematically and simultaneously for a freeway or a system of freeways.

#### **8.5 Data Availability**

Throughout the study, many traffic elements could not be assessed with complete data for all 20 ramps and for the whole testing duration. This was due not only to occasional communication failure to/from TMC, but mainly to loop sensor hard failure at one or more stations. The problem is critical with SWARM because the system relies on real-time field data.

#### **8.6 SWARM in Light Traffic Areas**

Both the Preliminary and the Final SWARM studies were conducted in W/B Freeway 210 corridor from 6:00 AM to 9:00 AM, during congestion periods. No study was made in a non-congestion time. Also, it is unknown what impact SWARM can have on the freeway traffic if it is assigned for a whole day or longer.

## **9. RECOMMENDATIONS**

The study was conducted in a specific freeway corridor: W/B LA-210 Freeway from Vernon Avenue to Lake Avenue, with the newly installed SATMS 2.3 chip. The test was performed in an idealized location where SWARM was expected to work well. It worked well because:

- the freeway system is relatively new and most of the hardware is in fairly good working condition.
- most of the on-ramps have the capacity for additional storage of vehicles, thus permitting the controllers to tighten down on existing metering rates.
- most of the on-ramps are not currently metered at the slowest rate, thus allowing the controllers the ability to tighten down on existing metering rates.

The use of SWARM at other freeway locations may not work as well. How well it will work will depend entirely upon storage available for vehicles and on the existing metering rates. If the existing queues at the on-ramps are already backed up to the city streets, SWARM will only make the back up worse and begin to affect the city street intersections. If the existing metering rates are at the slowest rate or close to it, there is no or very little leeway for SWARM to go to the slowest metering rate. Future testing on different freeways is expected to confirm the above.

The present SWARM Study has brought out the following recommendations:

1. Rates generated by a SWARM mode are based on data sent by field equipment to the TMC. Good quality of field equipment and communication line is essential.
2. SWARM depends on vehicle detection. Most of the existing VDS are located at on-ramp locations, where the ramp meters are located. In most cases, these are not actual bottlenecks locations. For SWARM to operate at a maximum capacity, additional VDS should be installed at identified bottlenecks, off-ramps, collector distributor road on and off, and connectors.
3. At times, SWARM operates the system in an inconsistent manner as to how the ramp meter system should be operating. Many of the problems are simply unexplainable. NET, the developers of the tested ramp metering system, should be brought back on board to review and fix the reported problems.
4. Where on-ramp traffic is already heavy and backed up during the peak hours, widening the ramp to provide more storage should be considered.
5. Connector meters should be considered, especially if there is enough storage room and safety is not compromised.

6. The obtained testing results of three SWARM modes and Modified TOD mode should be corroborated with more days of testing in the same freeway corridor or in other freeway corridors.
7. Similarly to the Preliminary SWARM study, this study was focused on congestion time traffic. No study was made outside peak hour congestion period. It is suggested that a few studies in the future be arranged for off peak hours.
8. In the near future, an enhanced version of SATMS 2.3, called SATMS 3.0 chip will be developed by District 7 and installed at all field controllers District wide. It is suggested that SWARM study be conducted at that time in other freeway corridors.
9. Many of the District freeways cannot carry more traffic and many of their on-ramps are backed up to the City streets. To better utilize the freeway corridor, motorists should be encouraged to use parallel freeway streets. Local agencies should be encouraged to implement better signal synchronization parallel to freeway, rather than towards the freeway.

## ATTACHMENTS

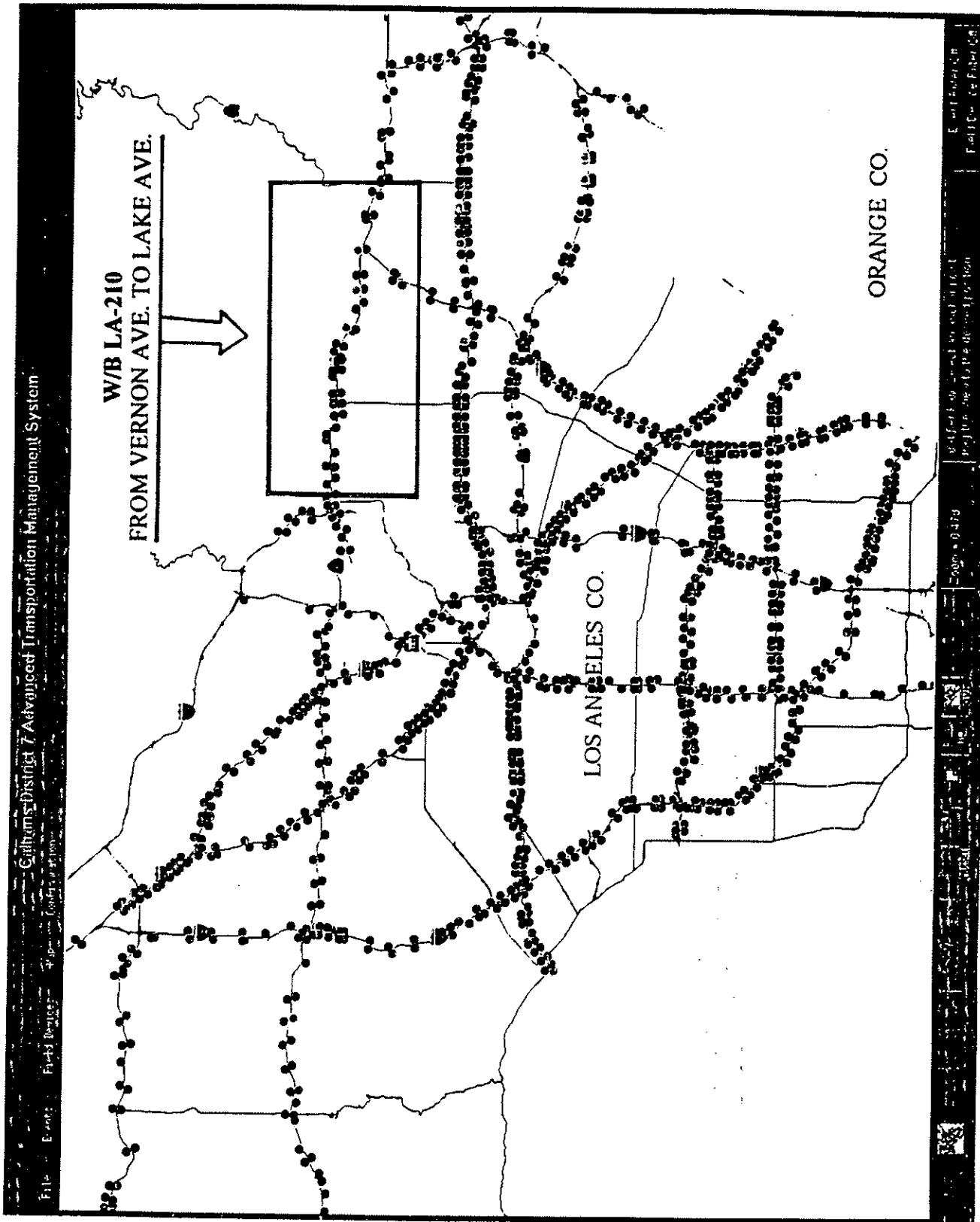
### 1. FIGURES

FIG. 1.1	Test Location
FIG. 1.2	Testing Corridor
FIG. 1.3	Testing Corridor Geometrics (6 Sheets)
FIG. 5.1	Average Mainline Volume from 6:00 AM to 9:00 AM
FIG. 5.2a	Average Mainline Speed from 6:00 AM to 9:00 AM
FIG. 5.2b	Average Mainline Speed from 7:30 AM to 7:45 AM
FIG. 5.3	Average Mainline Occupancy from 6:00 AM to 9:00 AM
FIG. 5.5	Average Queue Override from 6:00 AM to 9:00 AM
FIG. 5.7a	Average On-Ramp Volumes from 6:00 AM to 9:00 AM
FIG. 5.7b	On-Ramp Metered-Lane Average Volumes from 6:00 AM to 9:00 AM

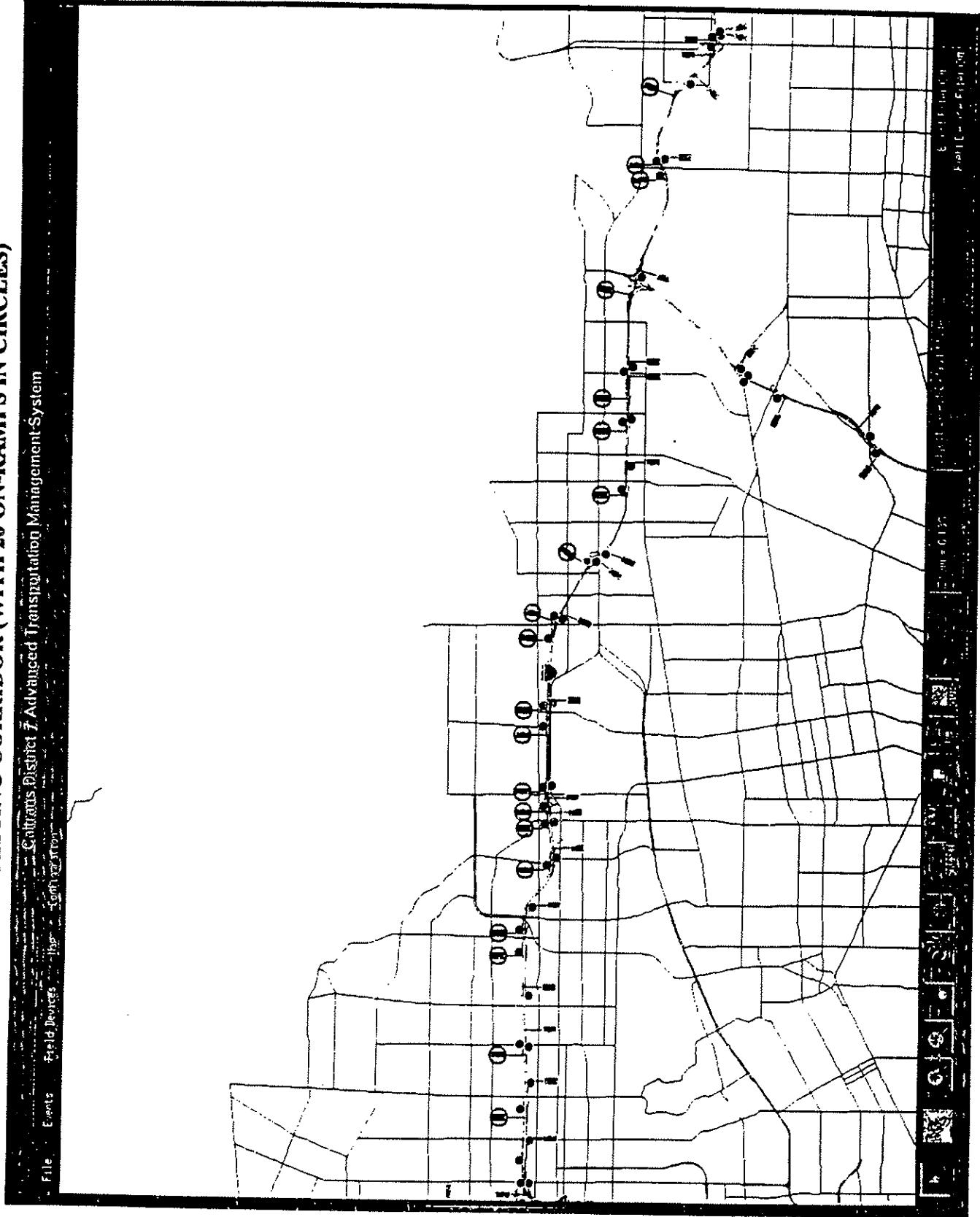
### 2. TABLES

TABLE 4.1	SWARM Test Schedule
TABLE 4.2	Rate and Cycle Length Variations
TABLES 5.1a1, 2	Mainline Volume
TABLE 5.1b	Average Mainline Volume
TABLES 5.2a1, 2	Mainline Speed from 6:00 Am to 9:00 AM
TABLE 5.2b	Average Mainline Speed from 6:00 Am to 9:00 AM
TABLES 5.2c1, 2	Mainline Speed from 7:30 Am to 7:45 AM
TABLE 5.2d	Average Mainline Speed from 7:30 AM to 7:45 AM
TABLES 5.3a1, 2	Mainline Occupancy
TABLE 5.3b	Average Mainline Occupancy
TABLE 5.4	Freeway Delay
TABLES 5.5a1, 2	Mode of Operation
TABLES 5.5b1, 2	Queue Override
TABLE 5.5c	Average Queue Override
TABLE 5.6	Travel Time
TABLES 5.7a1, 2	On-Ramp Volumes
TABLE 5.7b	Average On-Ramp Volumes
TABLES 5.7c1,2	On-Ramp Metered-Lane Volumes
TABLE 5.7d	On-Ramp Metered-Lane Average Volumes
TABLE 5.8	On-Ramp Queue Lengths
TABLE 6.1	Comparison of SWARM Modes to Original TOD Mode
TABLE 6.2	Comparison of SWARM Modes to Modified TOD Mode
TABLES 8.1a,b,c	Metering Rate Statistics
TABLES 8.2a,b,c	Ramp Metering Report
TABLES 8.3a1,2 <i>to</i>	
TABLES 8.3d1,2	RMS Control and Adjacent VDS Data

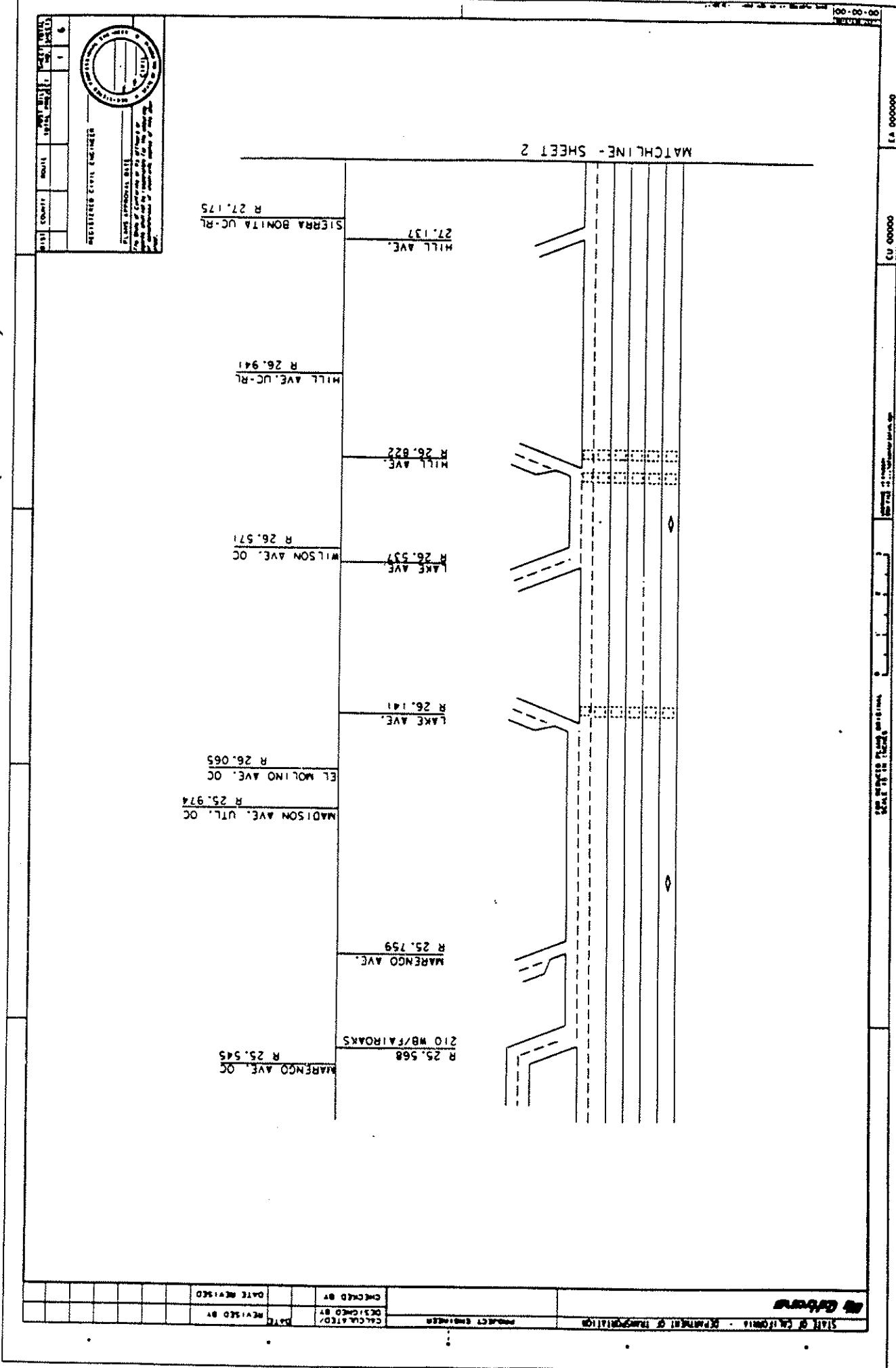
FIG. 1.1 TEST LOCATION



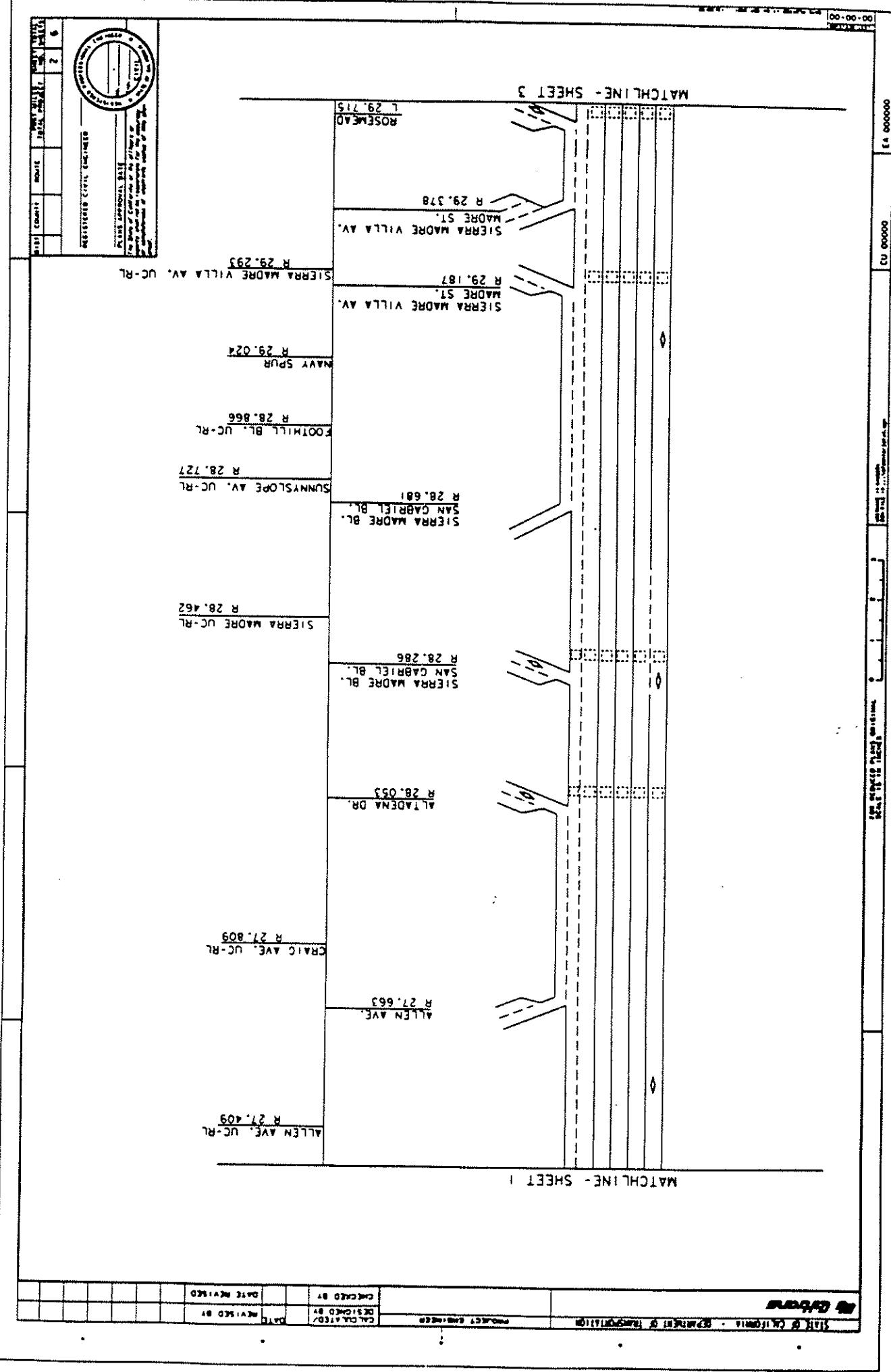
**FIG. 1.2 TESTING CORRIDOR (WITH 20 ON-RAMPS IN CIRCLES)**



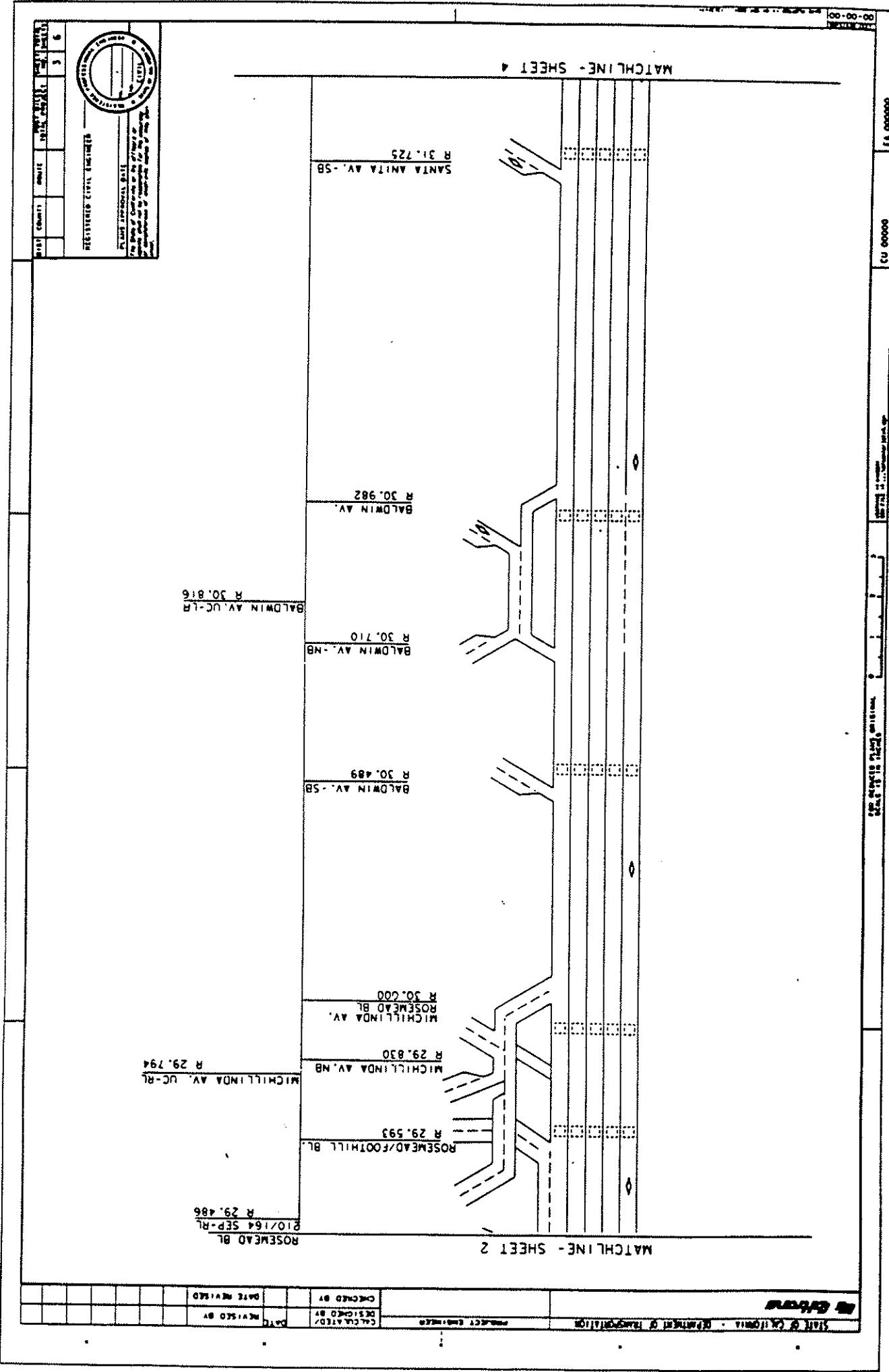
**FIG. 1.3 TESTING CORRIDOR GEOMETRICS (SHEET 1 OF 6)**



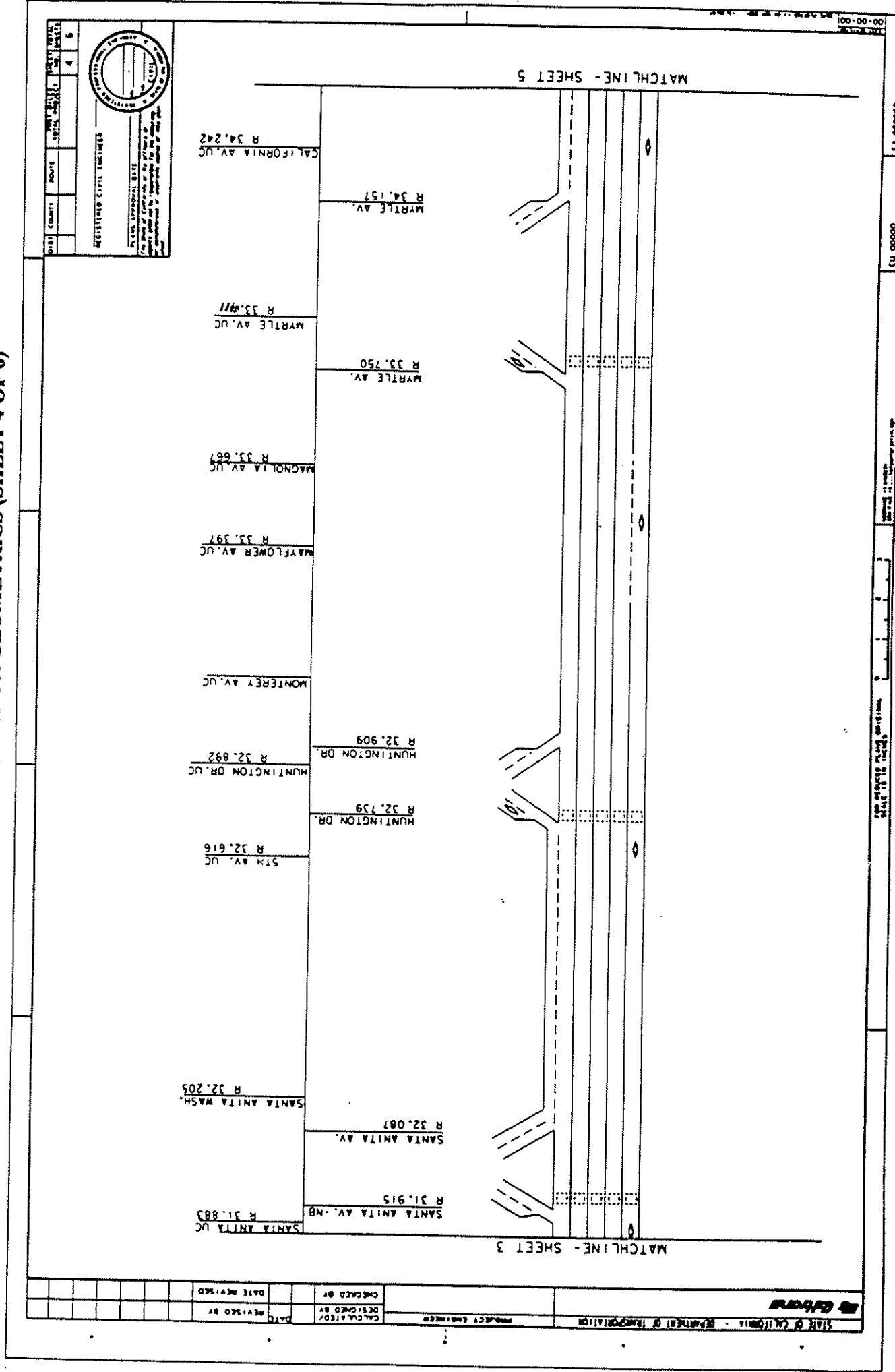
### FIG. 1.3 TESTING CORRIDOR GEOMETRICS (SHEET 2 OF 6)



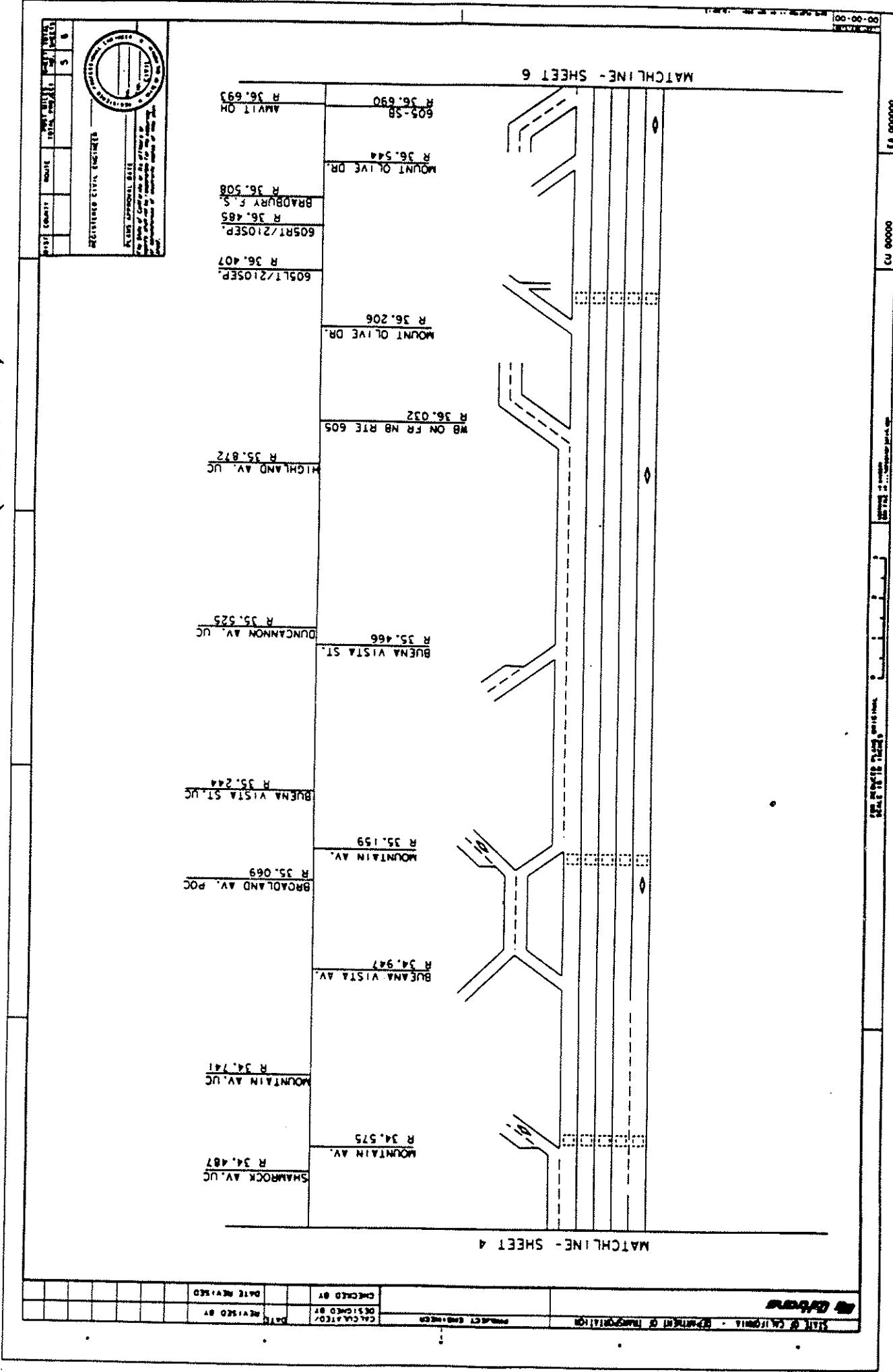
### FIG. 1.3 TESTING CORRIDOR GEOMETRICS (SHEET 3 OF 6)



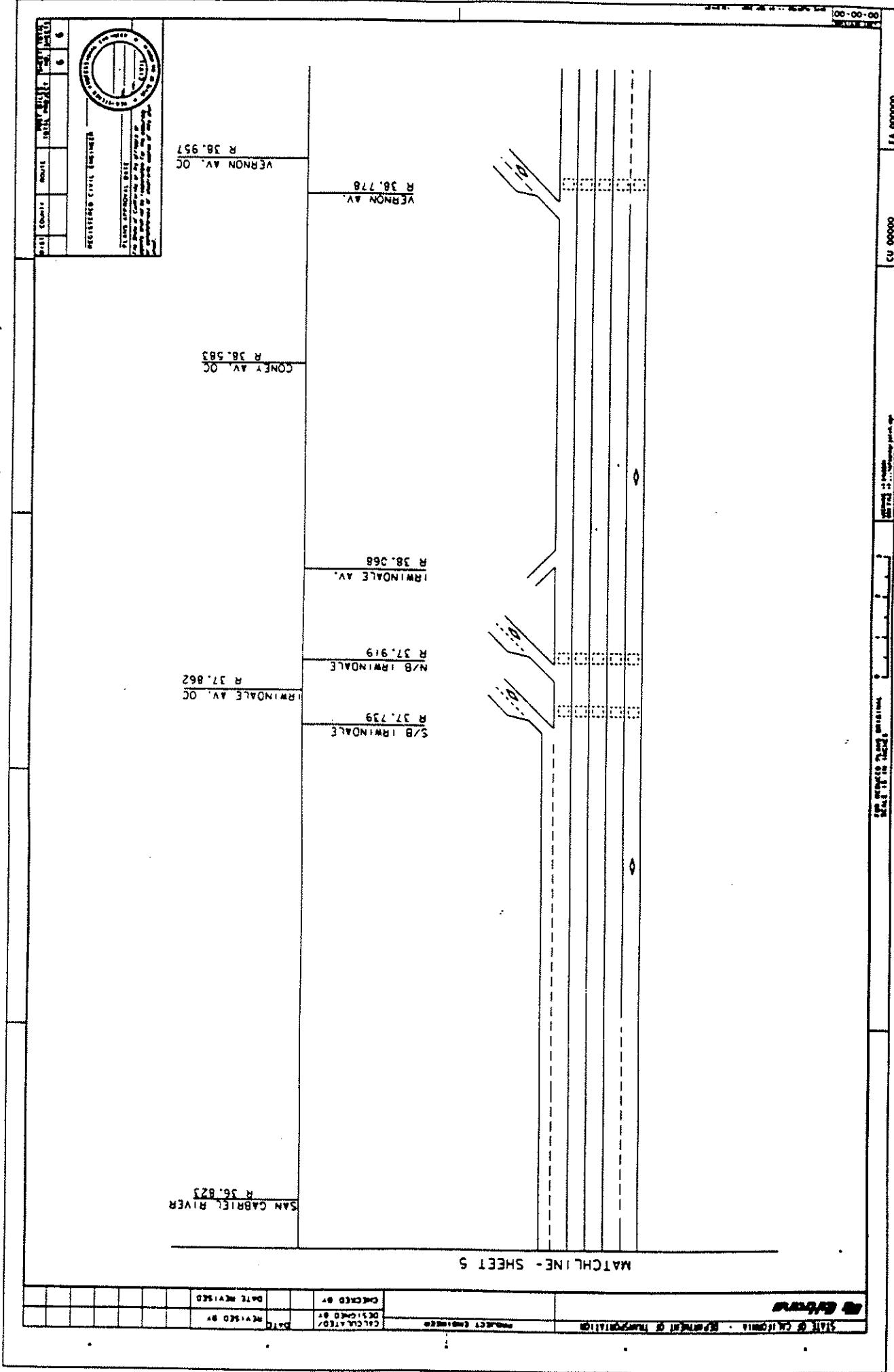
**FIG. 1.3 TESTING CORRIDOR GEOMETRICS (SHEET 4 OF 6)**



**FIG. 1.3 TESTING CORRIDOR GEOMETRICS (SHEET 5 OF 6)**



### FIG. 1.3 TESTING CORRIDOR GEOMETRICS (SHEET 6 OF 6)



## AVERAGE MAINLINE VOLUME (VEH) FROM 6:00 AM TO 9:00 AM

TOD — MOD. TOD — SWARM 1 — SWARM 2b — SWARM 1/2b

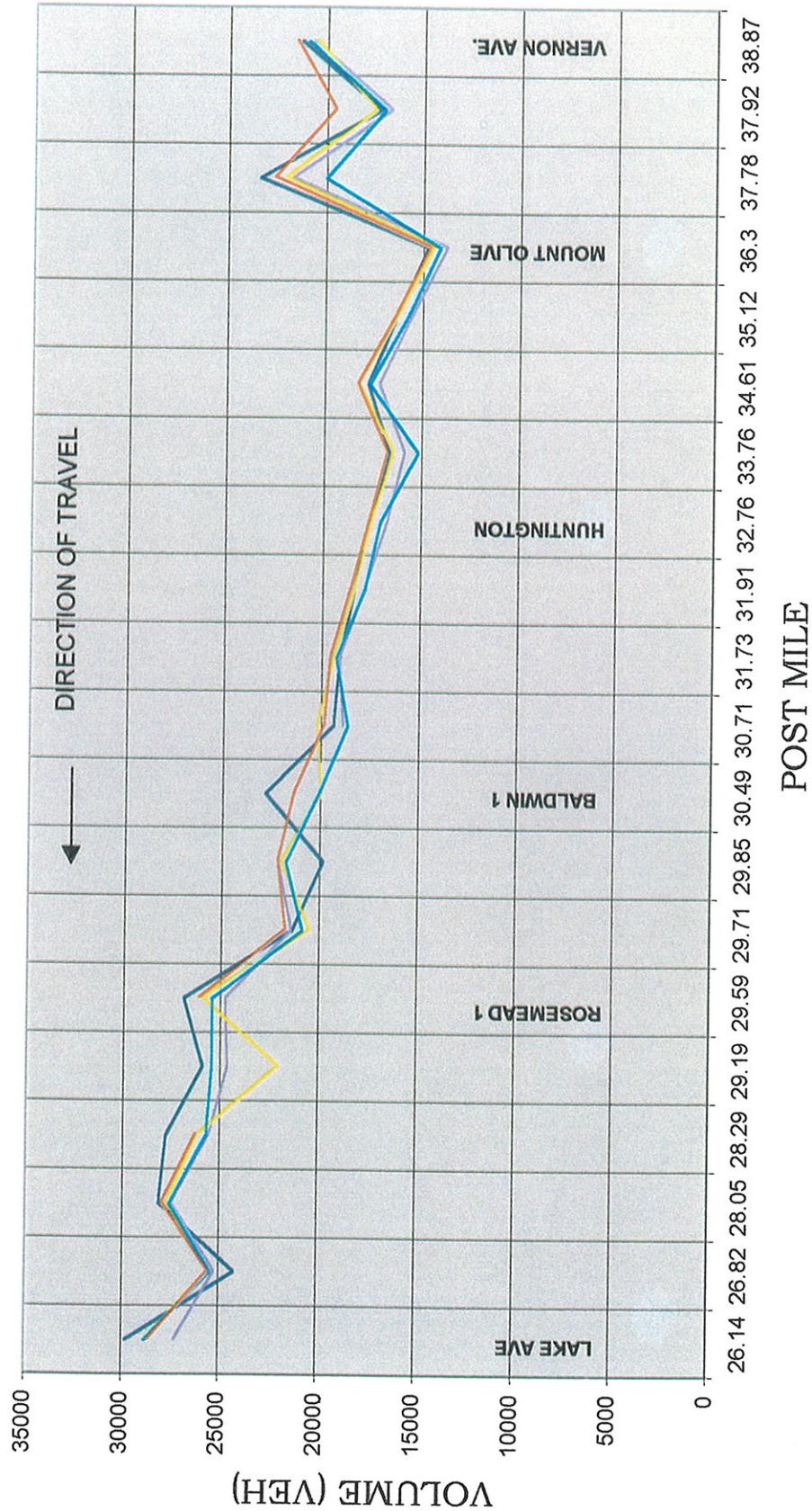


FIG. 5.1

## AVERAGE MAINLINE SPEED (MPH) FROM 6:00 AM TO 9:00 AM

TOD — MOD. TOD — SWARM 1 — SWARM 2b — SWARM 1/2b

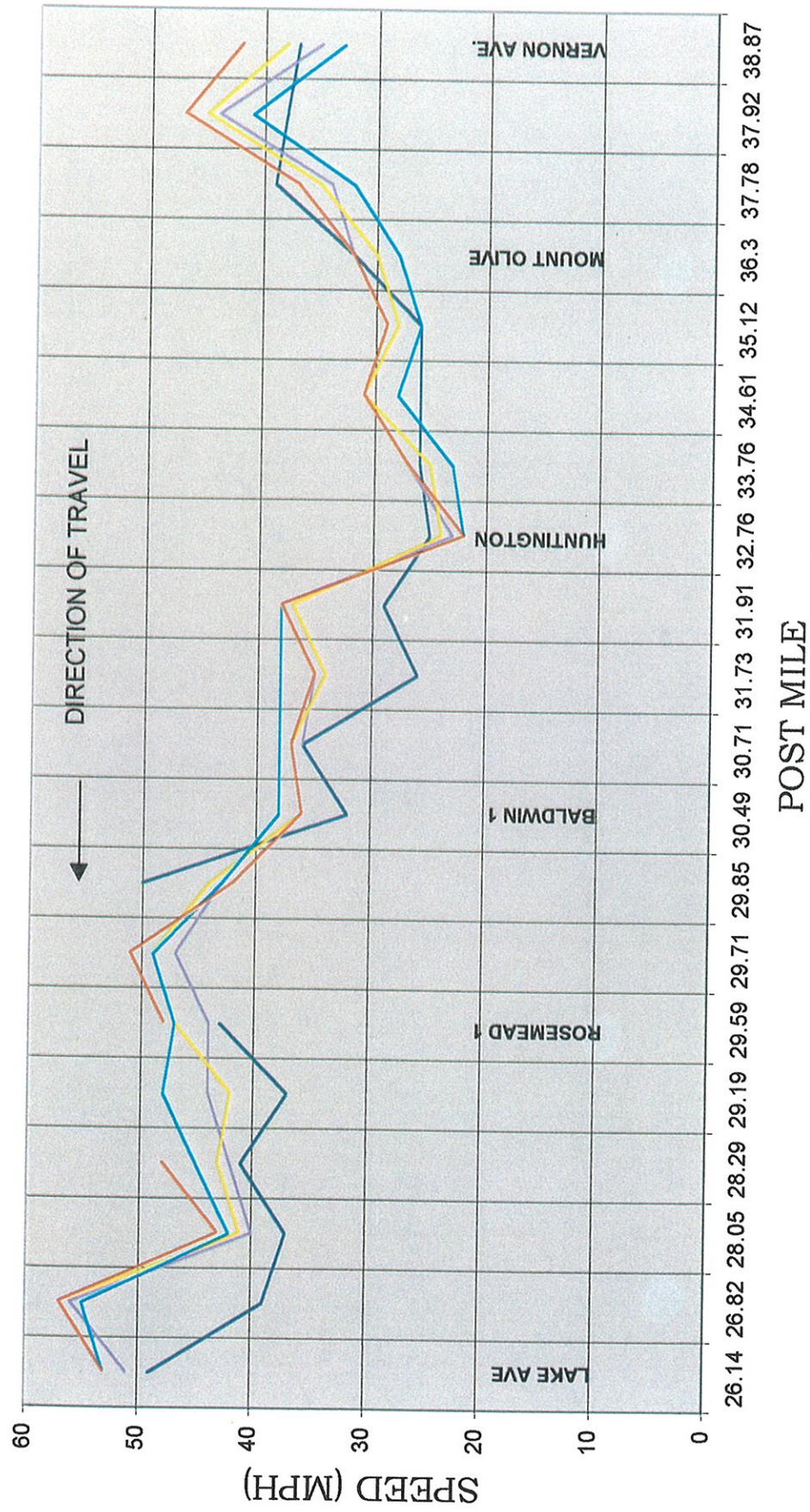


FIG. 5.2a

## AVERAGE MAINLINE SPEED (MPH) FROM 7:30 AM TO 7:45 AM

— TOD — MOD. TOD — SWARM 1 — SWARM 2b — SWARM 1/2b

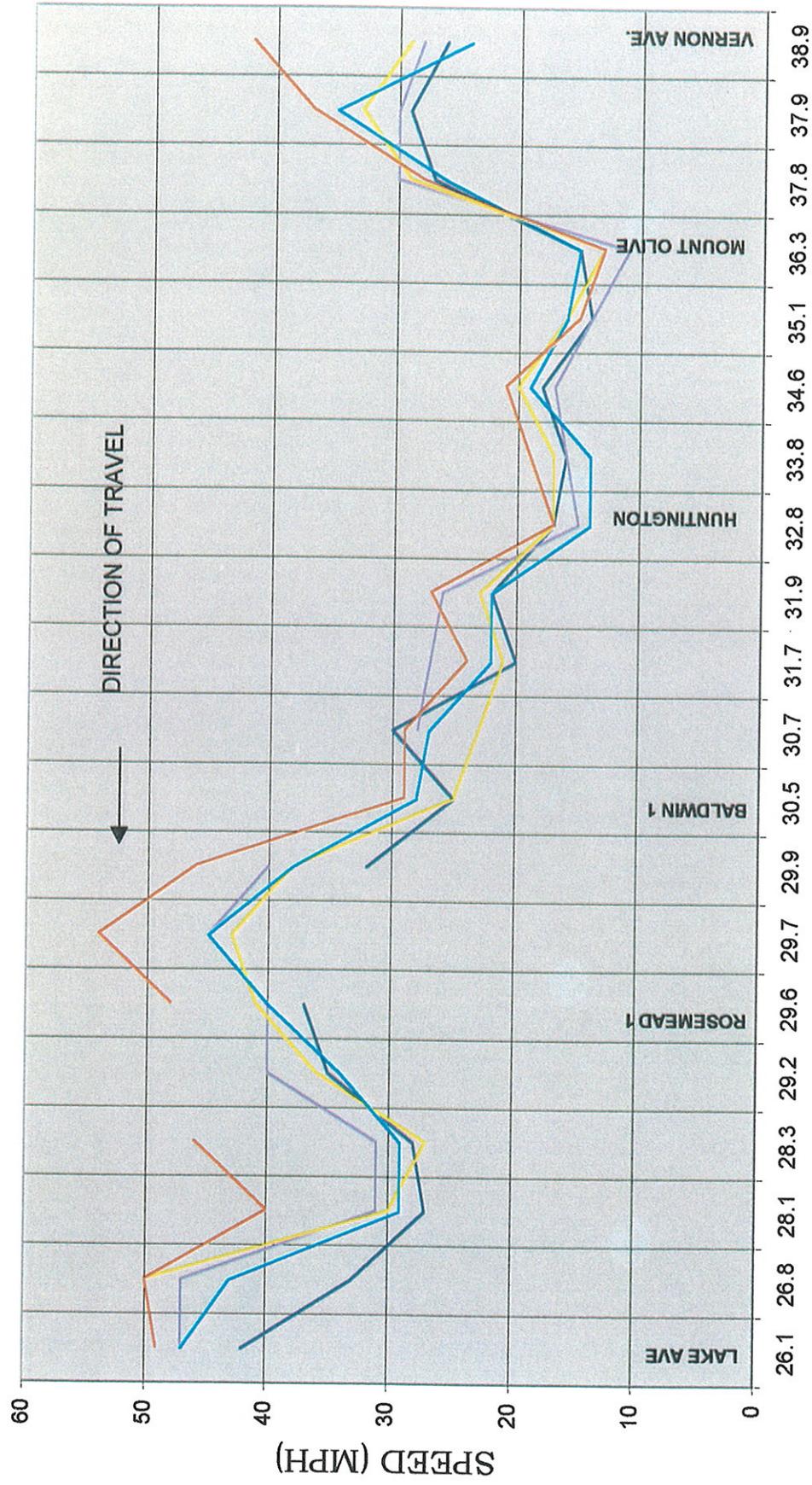


FIG. 5.2b

## AVERAGE MAINLINE OCCUPANCY FROM 6:00 AM TO 9:00 AM

— TOD — MOD. TOD — SWARM 1 — SWARM 2b — SWARM 1/2b

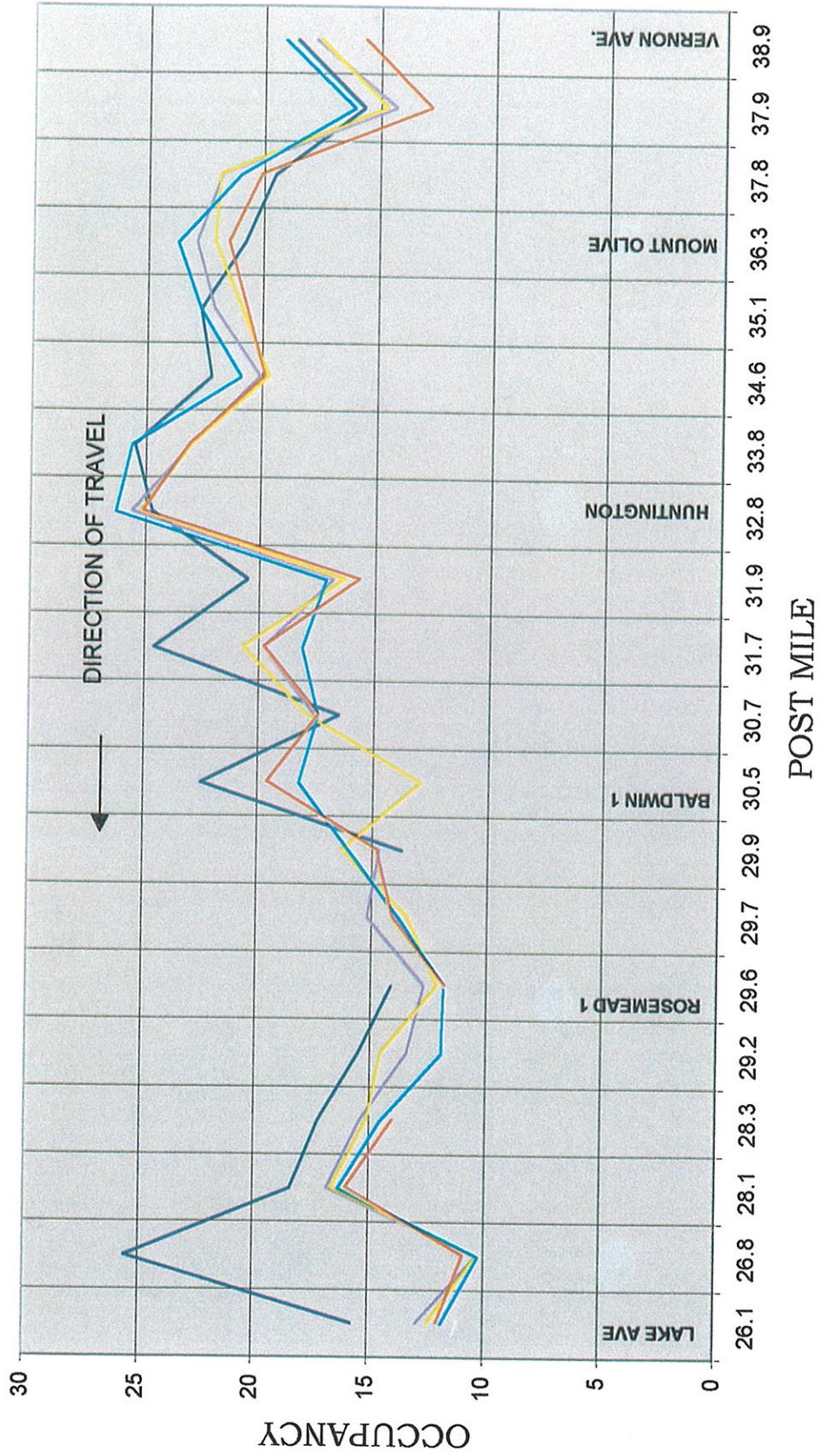


FIG. 5.3

## AVERAGE QUEUE OVERRIDE (%) FROM 6:00 AM TO 9:00 AM

TOD — MOD. TOD — SWARM 1 — SWARM 2b — SWARM 1/2b

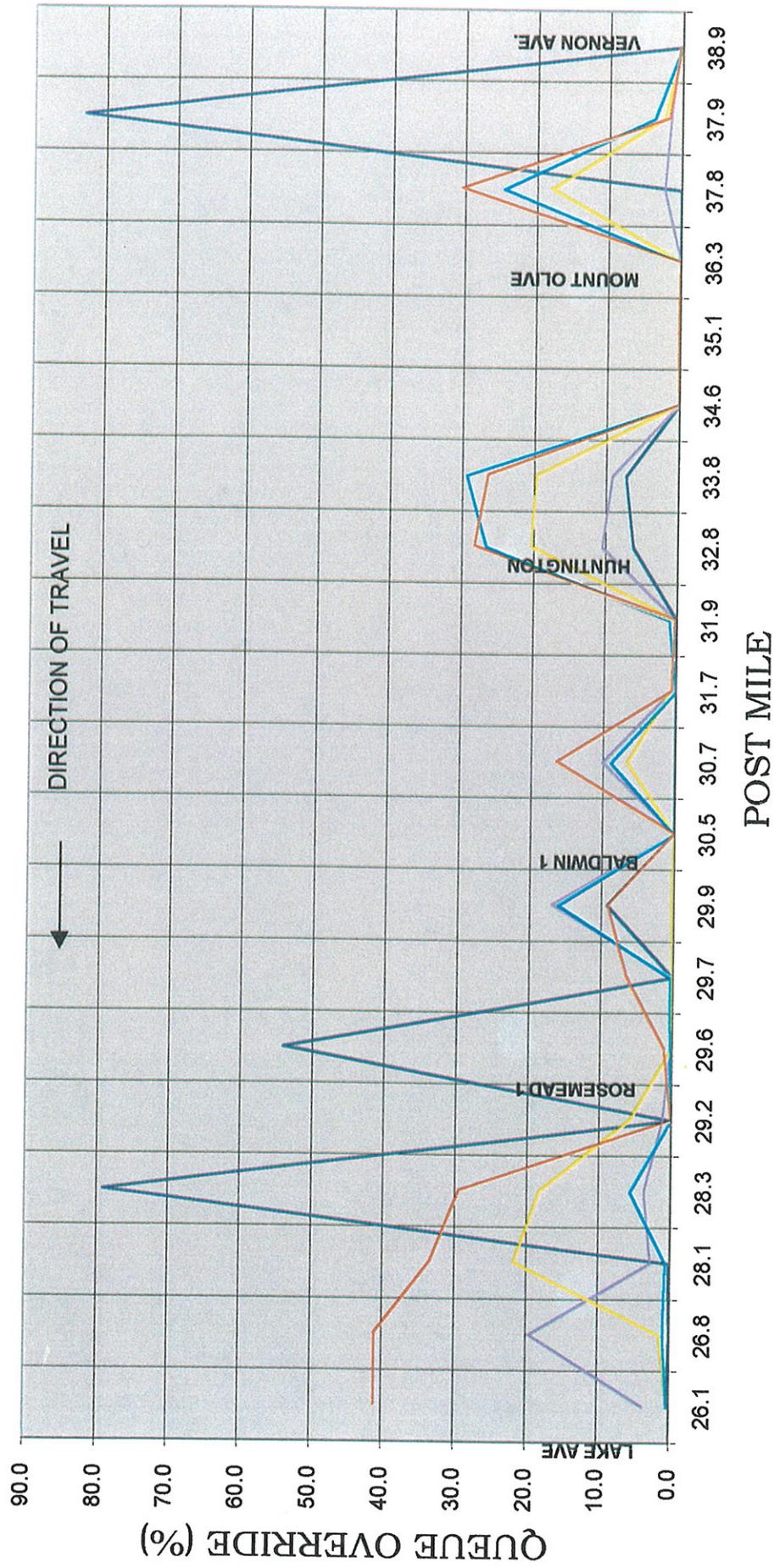


FIG. 5.5

## AVERAGE ON-RAMP VOLUMES (VEH) FROM 6:00 AM TO 9:00 AM

TOD — MOD. TOD — SWARM 1 — SWARM 2b — SWARM 1/2b

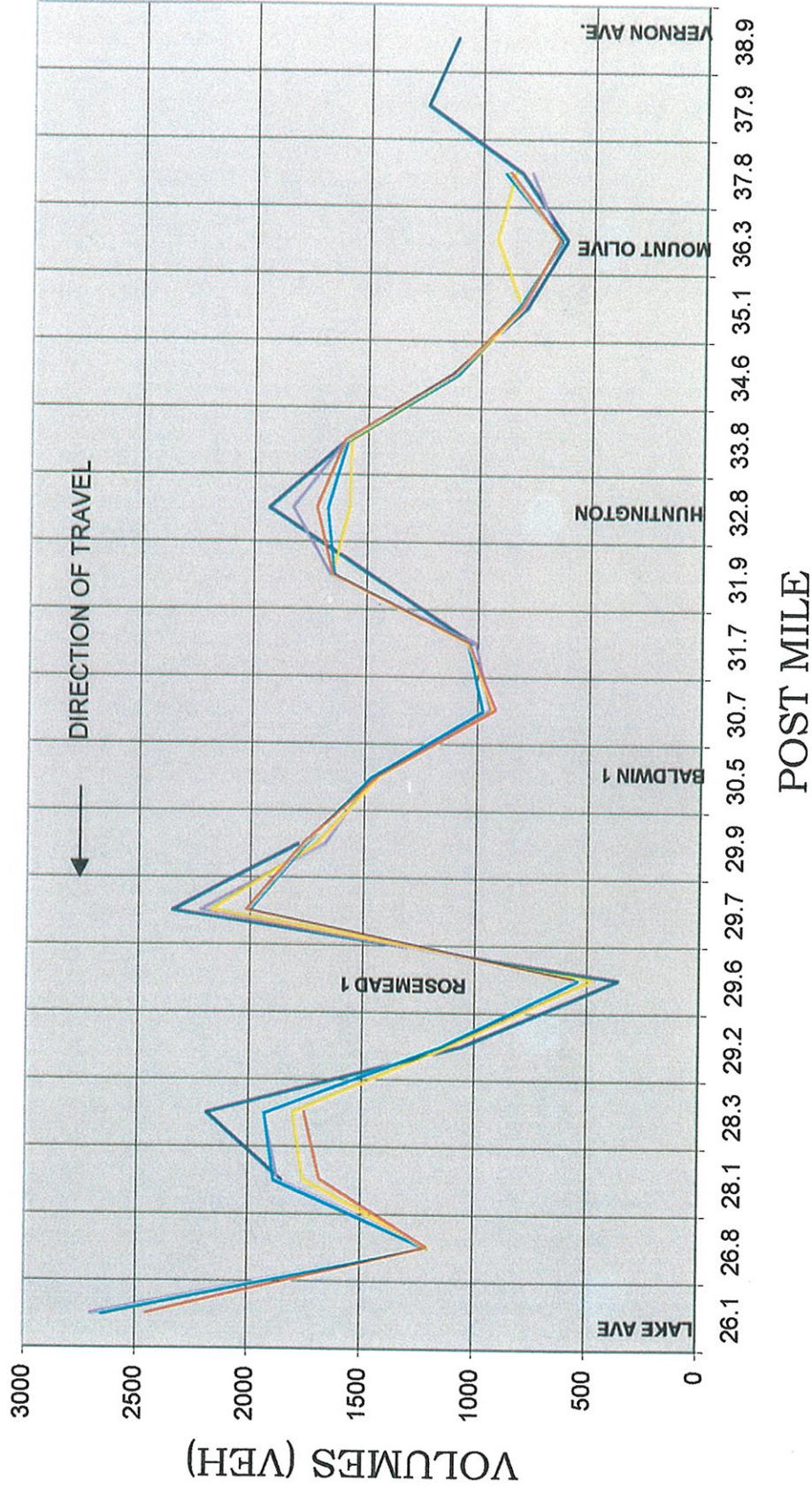
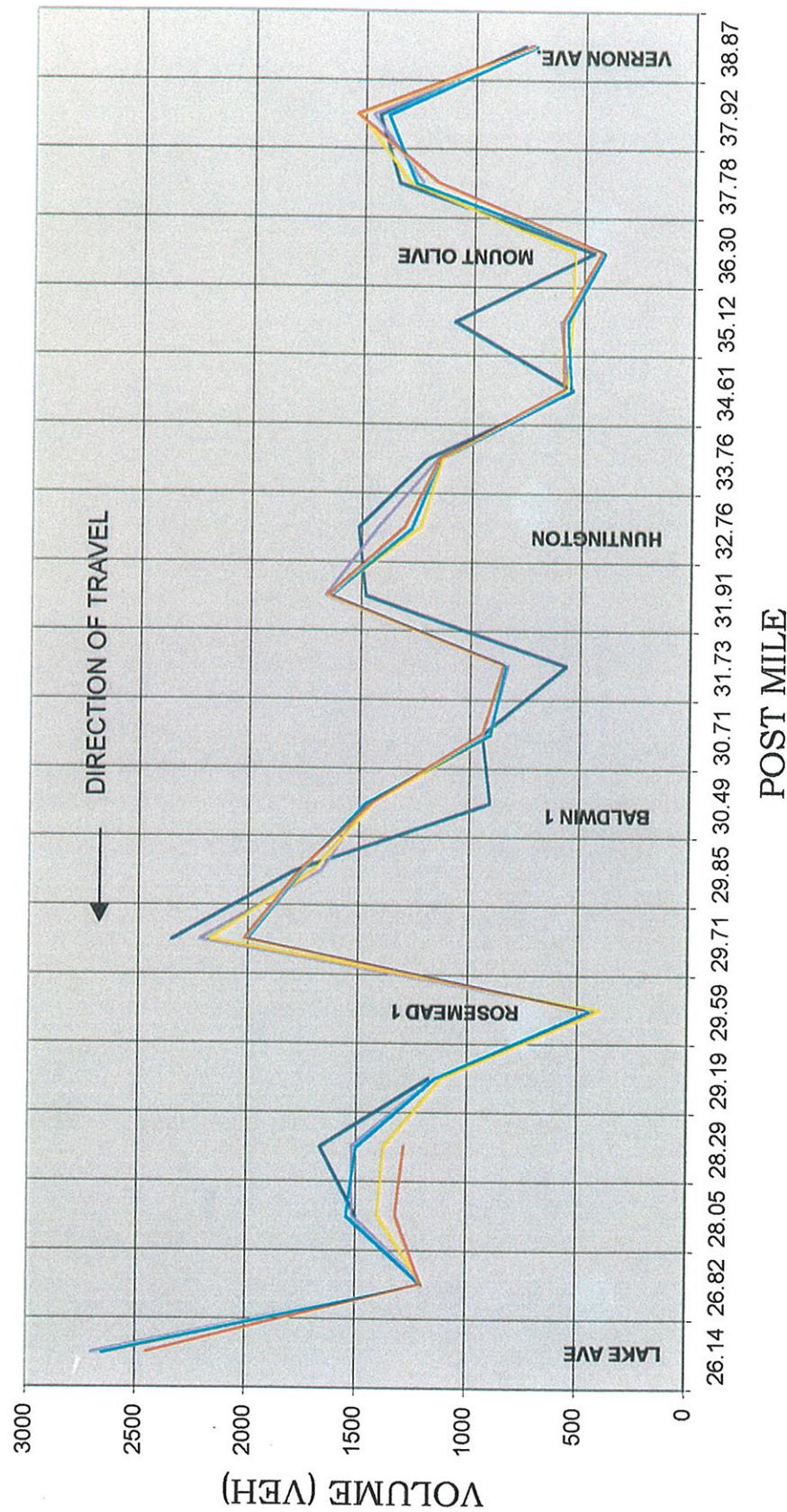


FIG. 5.7a

**ON-RAMP METERED LANE AVERAGE VOLUMES (VEH)  
FROM 6:00 AM TO 9:00 AM**

TOD MOD. TOD SWARM 1 SWARM 2b SWARM 1/2b



**FIG. 5.7b**

**TABLE 4.1**  
**SWARM TEST SCHEDULE**  
**W/B LA-210 FROM VERNON AVE TO LAKE AVE**

TESTED MODE	TUESDAY	WEDNESDAY	THURSDAY
<b>MODIFIED TOD</b>	<b>09/25/01</b> Done	<b>09/26/01</b> Done	<b>09/27/01</b> Done
<b>MODIFIED TOD</b>	<b>10/02/01</b> Done	<b>10/03/01</b> Done	<b>10/04/01</b> Done
<b>MODIFIED TOD</b>		<b>01/16/02</b> Queue Count only	
<b>SWARM 1</b>	<b>10/16/01</b> Done		
<b>SWARM 1</b>	<b>10/23/01</b> Done with Queue Count	<b>10/17/01</b> Done	
<b>SWARM 2b</b>		<b>10/24/01</b> Done with Queue Count	
<b>SWARM 2b</b>			<b>10/18/01</b> Done
<b>SWARM 1/2b</b>		<b>11/7/01</b> Done with Queue Count	
<b>SWARM 1/2b</b>			

**TABLE 4.2**  
**RATE AND CYCLE LENGTH VARIATIONS**

OLD METERING RATE (vpm)	CYCLE LENGTH (sec)	DECREASING	INCREASING	DELTA DECREASING	MINIMUM RATE WHEN RATE IS DECREASING (vpm)	MAXIMUM RATE WHEN RATE IS INCREASING (vpm)
3	20.0	N/A		5.0	3	4
4	15.0	5.0	3.0	3.0	3	5
5	12.0	3.0	2.0	2.0	4	6
6	10.0	2.0	1.4	1.4	5	7
7	8.6	1.4	1.1	1.1	6	9
8	7.5	1.1	0.8	0.8	7	11
9	6.7	0.8	0.7	0.7	7	12
10	6.0	0.7	0.5	0.5	8	15
11	5.5	0.5	0.5	0.5	8	15
12	5.0	0.5	0.4	0.4	9	15
13	4.6	0.4	0.3	0.3	10	15
14	4.3	0.3	0.3	0.3	10	15
15	4.0	0.3	N/A	10	10	15

**Note:** Do not change the cycle length more than 2 seconds if possible.

TABLE 5.1a1

**MAINLINE VOLUME (VEH)**  
**FROM 6:00 AM TO 9:00 AM**

STATION	ORIGINAL TOD				MODIFIED TOD			
	10/24/00	10/25/00	10/31/00	11/01/00	11/07/00	11/14/00	12/05/00	12/12/00
LAKE	28961	29970	30216	30607	30003	30394	29160	30094
HILL	26799	25424	23637	22683	24084	24862	27749	21618
ALTADENA	28368	28692	27911	27745	27929	28027	27592	28038
SAN GABRIEL	28591	28616	27511	26869	27857	26399	27973	28465
SIERRA MADRE VILLA	26006	26008	26784	24258	25902	25513	24544	27206
ROSEMEAD 1	27225	27374	26944	26455	26775	26732	26343	27343
ROSEMEAD 2	ND	ND	ND	ND	ND	ND	ND	21370
MICHILLINDA	19733	19853	19818	19520	19674	19281	19210	ND
BALDWIN 1	22161	22891	25291	24095	23409	23167	21589	24518
BALDWIN 2	19663	19758	19435	18853	19321	18994	18954	19860
SANTA ANITA 1	19384	19072	19094	18604	18837	18602	18793	20010
SANTA ANITA 2	18427	18684	18478	18030	18254	17987	17939	18892
HUNTINGTON	17753	17957	17593	17310	17539	17075	17181	18266
MYRTLE	16774	16901	16518	16239	16556	15826	16367	17426
MOUNTAIN	18166	18379	17446	17343	17865	16485	17440	18591
BUENA VISTA	16614	16566	16238	15837	16287	15566	15953	16864
MOUNT OLIVE	15127	15170	14761	14305	14810	13959	14575	15312
IRWINDALE 1	22786	22542	21948	22092	23002	21506	22338	22704
IRWINDALE 2	20026	19757	16169	18027	16154	15662	16430	16322
VERNON	21701	21511	20829	20570	21599	20544	21442	22010

**TABLE 5.1a2**  
**MAINLINE VOLUME (VEH)**  
**FROM 6:00 AM TO 9:00 AM**

STATION	ORIGINAL TOD				SWARM 1		SWARM 2b		SWARM 1/2b		
	10/24/00	10/31/00	11/01/00	11/07/00	11/14/00	12/05/00	12/07/00	10/16/01	10/23/01	10/24/01	10/18/01
LAKE	28961	29970	30216	30607	30903	3094	29160	3094	28784	28851	28823
HILL	26799	25424	23637	22683	24084	24862	27749	21618	21030	25498	25570
ALTADENA	28368	28692	27911	27745	27929	28027	27592	28577	28038	27525	27832
SAN GABRIEL	28591	28616	27511	26869	27857	26399	27973	28465	27505	258866	26372
SIERRA MADRE VILLA	26006	26008	26784	24258	25902	25513	24544	27206	26749	22029	ND
ROSEMEAD 1	27225	27374	26944	26455	26775	26732	26343	27343	26935	26053	25867
ROSEMEAD 2	ND	ND	ND	ND	ND	ND	ND	21370	19080	21900	20043
MICHILLINDA	19733	19853	19818	19520	19674	19281	19210	ND	21520	21802	22074
BALDWIN 1	22161	22891	25291	24095	23409	23167	21589	24518	18110	18827	21083
BALDWIN 2	19663	19758	19435	18853	19321	18994	18954	19860	19484	19882	20475
SANTA ANITA 1	19384	19072	19094	18604	18837	18602	18793	20010	19288	19556	19115
SANTA ANITA 2	18427	16684	18478	18030	18254	17987	17939	18892	18408	18467	18246
HUNTINGTON	17753	17957	17593	17310	17539	17075	17181	18266	17965	17558	17473
MYRTLE	16774	16901	16518	16239	16556	15926	16367	17426	17240	16352	16551
MOUNTAIN	18166	18379	17446	17343	17865	16485	17440	18591	18184	18322	18129
BUENA VISTA	16614	16566	16238	15837	16287	15566	15053	16864	16742	16383	16148
MOUNT OLIVE	15127	15170	14761	14305	14810	13959	14575	15312	14486	14629	14234
IRWINDALE 1	22786	22542	21948	22092	23002	21506	22338	22704	22526	22504	21652
IRWINDALE 2	20026	19757	16169	18027	16154	15662	16419	16430	16322	17261	17622
VERNON	21701	21511	20829	20570	21599	20544	21442	22010	21514	21486	20957

**TABLE 5.1b**  
**AVERAGE MAINLINE VOLUME (VEH) FROM 6:00 AM TO 9:00 AM**  
**COMPARISON WITH ORIGINAL TCD MODE AVERAGE VOLUME**

STATION	ORIGINAL TOD	MODIFIED TOD	SWARM 1		SWARM 2b		SWARM 1/2b	
			% OR TOD	% OR TOD				
LAKE	29799	27291	92	28837	97	28813	97	28829
HILL	24210	25251	104	25534	105	25460	105	25558
ALTADENA	28098	27490	98	27679	99	27565	98	27953
SAN GABRIEL	27754	25573	92	26119	94	25680	93	26259
SIERRA MADRE VILLA	25886	24628	95	22029	85	25420	98	ND
ROSEMEAD 1	26901	24765	92	25960	97	25455	95	26093
ROSEMEAD 2	21370	21412	100	20490	96	20821	97	21745
MICHILLINDA	19826	22147	112	21938	111	21717	110	22149
BALDWIN 1	22803	ND	ND	19955	88	20061	88	21363
BALDWIN 2	19369	18884	97	20179	104	18607	96	19864
SANTA ANITA 1	19076	19102	100	19356	101	19250	101	19577
SANTA ANITA 2	18344	17847	97	18357	100	17835	97	18559
HUNTINGTON	17627	16732	95	17516	99	17057	97	17657
MYRTLE	16650	15888	95	16452	99	15173	91	16759
MOUNTAIN	17767	17205	97	18226	103	17687	100	18308
BUENA VISTA	16296	15549	95	16266	100	15738	97	16393
MOUNT OLIVE	14723	13753	93	14432	98	14113	96	14631
IRWINDALE 1	22383	21757	97	22078	99	19991	89	22650
IRWINDALE 2	17218	16673	97	17442	101	17007	99	19570
VERNON	21302	20718	97	20529	96	20948	98	21575

TABLE 5.2a1  
**MAINLINE SPEED (MPH)**  
 FROM 6:00 AM TO 9:00 AM

STATION	ORIGINAL TOD						MODIFIED TOD								
	10/24/00	10/25/00	10/31/00	11/01/00	11/07/00	11/14/00	12/05/00	12/07/00	12/12/00	09/25/01	09/26/01	09/27/01	10/02/01	10/03/01	10/04/01
LAKE	44	46	49	50	48	43	54	53	51	52	53	52	53	52	41
HILL	44	40	47	35	41	39	38	32	37	52	55	54	62	56	54
ALTA DENA	36	36	35	35	35	37	40	40	40	38	38	39	41	40	43
SAN GABRIEL	41	40	38	40	39	42	41	44	41	38	40	40	43	42	47
SIERRA MADRE VILLA	44	41	40	ND	37	39	42	45	47	40	42	ND	44	ND	49
ROSEMEAD 1	43	42	41	40	41	42	45	47	47	41	42	44	45	44	48
ROSEMEAD 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	45	45	46	47	48	51
MICHILLINDA	52	53	48	50	51	46	49	ND	ND	40	40	43	42	43	47
BALDWIN 1	32	32	31	32	33	31	35	36	26	ND	ND	ND	ND	ND	ND
BALDWIN 2	36	37	35	36	31	39	40	37	33	32	35	36	37	41	
SANTA ANITA 1	27	25	25	24	24	24	29	30	28	34	30	35	34	35	44
SANTA ANITA 2	30	29	28	30	28	25	32	32	30	36	33	36	36	39	47
HUNTINGTON	26	25	22	26	23	23	26	28	23	24	22	21	25	23	25
MYRTLE	24	24	21	22	21	33	36	32	28	25	26	28	26	29	
MOUNTAIN	27	27	25	24	25	22	27	28	31	28	31	32	ND	ND	
BUENA VISTA	27	25	25	24	25	22	27	28	32	30	26	31	26	27	31
MOUNT OLIVE	42	31	30	28	32	29	30	36	33	32	30	28	42	31	29
IRWINDALE 1	41	40	36	35	45	32	37	43	42	33	33	34	35	36	34
IRWINDALE 2	39	36	32	24	50	34	37	42	46	44	43	46	41	47	42
VERNON	38	36	34	27	40	28	39	44	43	35	31	36	35	38	37

**TABLE 5.2a2**  
**MAINLINE SPEED (MPH)**  
**FROM 6:00 AM TO 9:00 AM**

STATION	ORIGINAL TOD				SWARM 1		SWARM 2b		SWARM 1/2b			
	10/24/00	10/25/00	11/01/00	11/07/00	11/14/00	12/05/00	12/07/00	10/16/01	10/23/01	10/24/01	10/18/01	11/07/01
LAKE	44	46	49	50	48	43	54	53	51	53	52	53
HILL	44	40	47	35	41	39	38	32	37	58	55	58
ALTADENA	36	36	35	35	35	37	40	40	40	42	41	44
SAN GABRIEL	41	40	38	40	39	42	41	44	41	42	44	46
SIERRA MADRE VILLA	44	41	40	ND	37	39	42	45	47	42	ND	ND
ROSEMEAD 1	43	42	41	40	41	42	45	47	47	46	47	49
ROSEMEAD 2	ND	ND	ND	ND	ND	ND	ND	ND	49	49	48	50
MICHILLINDA	52	53	48	50	51	46	49	ND	ND	44	42	42
BALDWIN 1	32	32	31	32	33	31	35	36	26	ND	36	36
BALDWIN 2	36	37	35	35	36	31	39	40	37	38	35	40
SANTA ANITA 1	27	25	25	24	24	24	29	30	28	35	32	37
SANTA ANITA 2	30	29	28	30	28	25	32	32	30	38	36	40
HUNTINGTON	26	25	22	26	23	23	26	28	23	24	24	20
MYRTLE	24	24	21	22	21	33	36	32	25	25	24	22
MOUNTAIN	27	27	25	24	25	22	27	28	31	30	29	27
BUENA VISTA	27	25	25	24	25	22	27	28	32	28	27	25
MOUNT OLIVE	42	31	30	28	32	29	30	36	33	31	29	30
IRWINDALE 1	41	40	36	35	45	32	37	43	42	38	31	32
IRWINDALE 2	39	36	32	24	50	34	37	42	46	49	40	41
VERNON	38	36	34	27	40	28	39	44	43	41	34	35

**TABLE 5.2b**  
**AVERAGE MAINLINE SPEED (MILES/HR) FROM 6:00 AM TO 9:00 AM**  
**COMPARISON WITH ORIGINAL TOD MODE AVERAGE SPEED**

STATION	ORIGINAL TOD	MODIFIED TOD	SWARM 1		SWARM 2b	
			%OR TOD	%OR TOD	%OR TOD	%OR TOD
LAKE	49	51	103	53	107	53
HILL	39	56	142	57	145	55
ALTA DENA	37	40	108	41	111	42
SAN GABRIEL	41	42	102	43	105	45
SIERRA MADRE VILLA	37	44	119	42	114	48
ROSEMEAD 1	43	44	102	47	108	47
ROSEMEAD 2	ND	47	ND	49	ND	49
MICHILLINDA	50	43	85	44	87	43
BALDWIN 1	32	NA	NA	36	113	38
BALDWIN 2	36	36	99	37	101	38
SANTA ANITA 1	26	35	136	34	129	38
SANTA ANITA 2	29	38	130	37	128	38
HUNTINGTON	25	23	93	24	96	22
MYRTLE	26	27	104	25	96	23
MOUNTAIN	26	31	117	31	117	28
BUENA VISTA	26	29	110	28	108	26
MOUNT OLIVE	32	32	100	30	94	28
IRWINDALE 1	39	34	88	35	88	32
IRWINDALE 2	38	44	115	45	117	41
VERNON	37	35	95	38	101	33

**TABLE 5.2c1**  
**MAINLINE SPEED (MPH)**  
**FROM 7:30 AM TO 7:45 AM**

STATION	ORIGINAL TOD						MODIFIED TOD							
	10/24/00	10/25/00	10/31/00	11/01/00	11/07/00	11/14/00	12/05/00	12/12/00	09/25/01	09/26/01	09/27/01	10/02/01	10/03/01	10/04/01
LAKE	44	48	40	36	43	36	44	44	47	46	46	49	49	48
HILL	34	47	48	21	32	33	21	26	39	39	43	56	58	48
ALTADENA	28	29	24	24	25	29	27	28	33	29	30	28	33	29
SAN GABRIEL	34	30	24	24	24	31	27	27	30	26	29	26	28	27
SIERRA MADRE VILLA	45	32	22	ND	26	39	41	31	41	33	34	ND	36	ND
ROSEMEAD 1	47	37	31	30	30	34	41	37	43	40	35	39	38	38
ROSEMEAD 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	43	42	43	43	44
MICHILLINDA	41	32	27	27	31	33	34	ND	ND	33	36	36	38	42
BALDWIN 1	25	28	24	21	24	32	28	28	18	ND	ND	ND	ND	ND
BALDWIN 2	28	28	34	21	25	33	30	38	33	18	21	26	26	30
SANTA ANITA 1	20	21	23	17	18	20	18	23	23	19	17	24	21	24
SANTA ANITA 2	23	22	25	20	19	19	22	23	23	19	18	22	20	25
HUNTINGTON	16	19	17	16	17	16	16	19	18	14	12	16	15	17
MYRTLE	14	19	10	14	16	14	19	18	16	13	12	18	17	19
MOUNTAIN	20	19	14	17	19	15	19	19	22	15	16	17	21	ND
BUENA VISTA	14	15	11	13	16	13	17	15	16	11	12	14	16	17
MOUNT OLIVE	17	14	13	14	17	12	16	13	15	10	10	11	12	12
IRWINDALE 1	35	22	27	40	18	21	26	28	25	24	31	56	27	15
IRWINDALE 2	36	28	20	29	37	22	19	39	31	31	32	NA	32	25
VERNON	33	22	21	22	40	16	21	30	26	21	25	26	49	24

TABLE 5.2c2

## MAINLINE SPEED (MPH)

FROM 7:30 AM TO 7:45 AM

STATION	ORIGINAL TOD			SWARM 1			SWARM 2b			SWARM 1/2b					
	10/24/00	10/31/00	11/01/00	11/07/00	11/14/00	12/05/00	12/07/00	12/12/00	10/16/01	10/17/01	10/23/01	10/24/01	10/18/01	11/07/01	
LAKE	44	48	40	36	43	36	44	44	47	47	50	48	45	49	48
HILL	34	47	48	21	32	33	21	26	39	45	55	42	43	49	51
ALTADENA	28	29	24	24	25	29	27	28	33	27	33	33	25	32	48
SAN GABRIEL	34	30	24	24	31	27	27	27	30	26	28	32	25	36	55
SIERRA MADRE VILLA	45	32	22	ND	26	39	41	31	41	36	ND	ND	34	ND	ND
ROSEMEAD 1	47	37	31	30	34	41	37	43	43	38	42	38	48	48	48
ROSEMEAD 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	44	42	47	42	52	55
MICHILLINDA	41	32	27	27	31	33	34	ND	ND	39	36	41	35	46	NA
BALDWIN 1	25	28	24	21	24	32	28	28	18	ND	25	30	26	27	30
BALDWIN 2	28	28	34	21	25	33	30	38	33	25	21	26	27	26	31
SANTA ANITA 1	20	21	23	17	18	20	18	23	23	20	21	20	24	23	25
SANTA ANITA 2	23	22	25	20	19	19	22	23	23	22	24	22	21	25	29
HUNTINGTON	16	19	17	16	17	16	16	19	18	16	18	15	13	17	17
MYRTLE	14	19	10	14	16	14	19	18	16	17	16	13	15	18	20
MOUNTAIN	20	19	14	17	19	15	19	19	22	20	20	17	21	20	21
BUENA VISTA	14	15	11	13	16	13	17	15	16	19	13	16	15	14	16
MOUNT OLIVE	17	14	13	14	17	12	16	13	15	16	10	14	16	12	13
IRWINDALE 1	35	22	27	27	40	18	21	26	28	34	23	24	27	27	28
IRWINDALE 2	36	28	20	29	37	22	19	39	37	28	30	39	32	41	
VERNON	33	22	21	22	40	16	21	30	26	33	25	21	27	25	58

**TABLE 5.2d**  
**AVERAGE MAINLINE SPEED (MPH) FROM 7:30 AM TO 7:45 AM**  
**COMPARISON WITH ORIGINAL TOD MODE AVERAGE SPEED**

STATION	ORIGINAL TOD	MODIFIED TOD		SWARM 1		SWARM 2b		SWARM 1/2b	
		%OR TOD	%OR TOD	%OR TOD	%OR TOD	%OR TOD	%OR TOD	%OR TOD	%OR TOD
LAKE	42	47	112	49	115	47	111	49	115
HILL	33	47	143	50	152	43	129	50	152
ALTA DENA	27	31	115	30	111	29	107	40	148
SAN GABRIEL	28	31	110	27	96	29	102	46	163
SIERRA MADRE VILLA	35	40	114	36	103	34	97	NA	ND
ROSEMEAD 1	37	40	109	41	109	40	108	48	130
ROSEMEAD 2	ND	45	ND	43	ND	45	ND	54	ND
MICHILLINDA	32	40	123	38	117	38	119	46	144
BALDWIN 1	25	NA	NA	25	100	28	112	29	114
BALDWIN 2	30	28	94	23	77	27	88	29	95
SANTA ANITA 1	20	27	133	21	103	22	110	24	120
SANTA ANITA 2	22	26	119	23	105	22	98	27	123
HUNTINGTON	17	15	89	17	100	14	82	17	100
MYRTLE	16	16	97	17	103	14	88	19	119
MOUNTAIN	18	17	96	20	111	19	106	21	114
BUENA VISTA	14	14	96	16	114	16	111	15	107
MOUNT OLIVE	15	11	71	13	87	15	100	13	83
IRWINDALE 1	27	30	110	29	106	26	94	28	102
IRWINDALE 2	29	30	103	33	112	35	119	37	126
VERNON	26	28	106	29	112	24	92	42	160

TABLE 5.3a1

## MAINLINE OCCUPANCY

FROM 6:00 AM TO 9:00 AM

STATION	ORIGINAL TOD						MODIFIED TOD								
	10/24/00	10/25/00	10/31/00	11/01/00	11/07/00	11/14/00	12/05/00	12/07/00	12/12/00	09/25/01	09/26/01	09/27/01	10/02/01	10/03/01	10/04/01
LAKE	18.5	15.8	13.6	18.9	12.4	19.7	12.6	16.0	14.2	12.2	12.3	12.2	12.6	16.1	
HILL	19.1	23.1	23.8	29.9	24.1	25.1	24.7	30.5	30.2	11.2	10.5	10.4	8.8	10.2	10.7
ALTADENA	18.4	18.6	19.7	19.7	19.0	18.6	17.1	17.5	16.8	17.3	17.1	16.2	16.9	15.7	
SAN GABRIEL	17.3	17.6	18.2	17.9	18.1	16.3	17.3	16.4	16.0	16.5	15.8	15.7	15.2	15.5	13.8
SIERRA MADRE VILLA	13.5	14.5	16.0	22.6	16.2	15.6	16.4	13.2	11.9	14.4	14.3	ND	13.0	ND	11.9
ROSEMEAD 1	13.9	14.3	15.0	15.5	15.0	14.6	13.4	12.9	12.3	13.2	13.6	12.7	12.4	12.8	11.7
ROSEMEAD 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.5	15.9	15.7	15.2	14.6	14.6
MICHILLINDA	15.2	14.8	16.3	17.0	15.9	15.8	16.1	ND	11.9	15.7	15.7	14.7	14.3	14.6	13.4
BALDWIN 1	22.1	19.3	23.7	24.3	21.9	22.0	19.0	20.6	29.6	ND	ND	ND	ND	ND	ND
BALDWIN 2	16.7	15.8	16.9	18.3	16.9	17.9	15.7	15.1	14.9	19.6	19.6	17.4	16.3	16.7	16.1
SANTA ANITA 1	24.8	26.4	25.0	26.0	26.3	26.3	22.7	21.6	22.1	21.8	22.7	20.7	18.9	18.8	15.9
SANTA ANITA 2	20.2	20.4	21.0	21.1	21.2	22.6	19.7	19.0	19.4	18.8	19.5	17.6	16.1	15.9	12.6
HUNTINGTON	23.4	24.7	26.1	25.0	25.8	26.0	24.6	22.5	23.9	25.9	26.7	26.3	23.3	25.8	25.3
MYRTLE	25.6	25.4	27.4	27.5	27.3	28.6	23.9	21.9	22.0	24.4	24.7	23.2	20.3	23.6	22.0
MOUNTAIN	22.4	22.0	24.1	24.3	23.2	24.9	21.0	19.6	18.1	21.5	21.6	19.9	17.5	ND	ND
BUENA VISTA	22.1	22.7	23.9	24.9	23.4	25.7	22.1	21.2	18.4	22.4	23.3	19.8	24.4	21.5	21.1
MOUNT OLIVE	14.2	21.2	22.7	24.4	21.3	25.0	22.7	18.8	16.6	23.0	23.9	21.5	22.7	22.3	
IRWINDALE 1	18.2	18.7	20.6	20.6	16.3	22.9	20.3	20.3	17.5	23.2	22.8	21.2	20.9	20.4	22.1
IRWINDALE 2	15.6	17.5	18.4	22.7	9.7	16.3	15.9	13.7	11.9	14.0	14.8	13.0	16.0	12.6	15.3
VERNON	17.4	18.4	20.2	23.7	17.1	22.4	16.9	15.6	15.9	19.4	19.5	17.5	17.3	16.9	16.4

TABLE 5.3a2

## MAINLINE OCCUPANCY

FROM 6:00 AM TO 9:00 AM

STATION	ORIGINAL TOD				SWARM 1		SWARM 2b		SWARM 1/2b									
	10/24/00	10/25/00	10/31/00	11/01/00	11/07/00	11/14/00	12/05/00	12/12/00	10/23/01	10/17/01	10/24/01	10/18/01	10/24/01	10/17/01	10/18/01	10/24/01	10/17/01	10/18/01
LAKE	18.5	15.8	13.6	18.9	12.4	19.7	12.6	16.0	14.2	12.2	12.5	11.7	11.8	11.6	11.6	11.8	11.6	12.4
HILL	19.1	23.1	23.8	29.9	24.1	25.1	24.7	30.5	30.2	9.7	10.8	9.7	10.6	11.5	11.5	10.6	11.5	10.2
ALTADENA	18.4	18.6	19.7	19.0	18.6	17.1	17.5	16.8	17.3	15.9	15.9	16.3	16.2	16.5	16.5	16.2	16.5	15.5
SAN GABRIEL	17.3	17.6	18.2	17.9	18.1	16.3	17.3	16.4	16.0	15.4	14.8	14.9	14.1	14.8	14.1	14.8	14.1	13.1
SIERRA MADRE VILLA	13.5	14.5	16.0	22.6	16.2	15.6	16.4	13.2	11.9	14.5	ND	ND	ND	11.9	ND	ND	ND	ND
ROSEMEAD 1	13.9	14.3	15.0	15.5	15.0	14.6	13.4	12.9	12.3	12.3	11.9	12.0	11.6	11.6	11.6	11.6	11.6	11.6
ROSEMEAD 2	ND	ND	ND	ND	ND	ND	ND	ND	4.5	12.4	14.4	13.6	14.0	14.3	13.8	14.0	14.3	13.8
MICHILLINDA	15.2	14.8	16.3	17.0	15.9	15.8	16.1	ND	11.9	16.9	15.7	14.7	17.3	14.8	ND	ND	ND	ND
BALDWIN 1	22.1	19.3	23.7	24.3	21.9	22.0	19.0	20.6	29.6	6.7	19.0	19.0	17.3	17.3	18.4	20.8	20.8	18.4
BALDWIN 2	16.7	15.8	16.9	18.3	16.9	17.9	15.7	15.1	14.9	16.6	19.1	17.5	17.2	19.6	19.6	19.6	19.6	15.2
SANTA ANITA 1	24.8	26.4	25.0	26.0	26.3	26.3	22.7	21.6	22.1	19.7	21.6	20.4	15.7	21.1	18.4	21.1	18.4	18.4
SANTA ANITA 2	20.2	20.4	21.0	21.1	21.2	22.6	19.7	19.0	19.4	15.3	17.3	17.4	16.7	17.0	14.3	17.0	14.3	14.3
HUNTINGTON	23.4	24.7	26.1	25.0	25.8	26.0	24.6	22.5	23.9	25.3	25.1	24.2	28.4	26.3	23.8	26.3	23.8	23.8
MYRTLE	25.6	25.4	27.4	27.5	27.3	28.6	23.9	21.9	22.0	22.1	23.9	23.9	27.3	24.1	22.0	24.1	22.0	22.0
MOUNTAIN	22.4	22.0	24.1	24.3	23.2	24.9	21.0	19.6	18.1	19.4	19.9	20.7	21.0	20.5	19.2	20.5	19.2	19.2
BUENA VISTA	22.1	22.7	23.9	24.9	23.4	25.7	22.1	21.2	18.4	20.4	21.3	22.7	22.7	21.5	19.8	21.5	19.8	19.8
MOUNT OLIVE	14.2	21.2	22.7	24.4	21.3	25.0	22.7	18.8	16.6	20.5	23.6	23.2	24.1	23.3	19.7	23.3	19.7	19.7
IRWINDALE 1	18.2	18.7	20.6	16.3	22.9	20.3	20.3	17.5	19.6	24.1	20.8	21.1	21.1	21.9	18.2	21.9	18.2	18.2
IRWINDALE 2	15.6	17.5	18.4	22.7	9.7	16.3	15.9	13.7	11.9	13.1	16.3	15.3	16.8	13.5	12.0	13.5	12.0	12.0
VERNON	17.4	18.4	20.2	23.7	17.1	22.4	16.9	15.6	15.9	16.0	19.1	19.7	18.4	18.1	13.3	18.1	13.3	13.3

**TABLE 5.3b**  
**AVERAGE MAINLINE OCCUPANCY FROM 6:00 AM TO 9:00 AM**  
**COMPARISON WITH ORIGINAL TOD MODE AVERAGE OCCUPANCY**

STATION	ORIGINAL TOD	MODIFIED TOD	SWARM 1	SWARM 2b	SWARM 1/2b
		%OR TOD	%OR TOD	%OR TOD	%OR TOD
LAKE	15.7	12.9	82	12.4	79
HILL	25.6	10.3	40	10.3	40
ALTADENA	18.4	16.8	91	16.6	90
SAN GABRIEL	17.2	15.4	90	15.1	88
SIERRA MADRE VILLA	15.5	13.4	86	14.5	94
ROSEMEAD 1	14.1	12.7	90	12.1	86
ROSEMEAD 2	ND	15.2	ND	13.4	ND
MICHILLINDA	13.7	14.7	108	16.3	119
BALDWIN 1	22.5	ND	ND	12.9	57
BALDWIN 2	16.5	17.6	107	17.9	108
SANTA ANITA 1	24.6	19.8	80	20.7	84
SANTA ANITA 2	20.5	16.8	82	16.3	80
HUNTINGTON	24.7	25.6	103	25.2	102
MYRTLE	25.5	23.0	90	23.0	90
MOUNTAIN	22.2	20.1	91	19.7	89
BUENA VISTA	22.7	22.1	97	20.9	92
MOUNT OLIVE	20.8	22.9	110	22.1	106
IRWINDALE 1	19.5	21.8	112	21.9	112
IRWINDALE 2	15.7	14.3	91	14.7	94
VERNON	18.6	17.8	96	17.6	94

**TABLE 5.4**  
**FREEWAY DELAY (VEH.HR) FROM VERNON TO LAKE**  
**FROM 6:00 AM TO 9:00 AM**

MODE	FREEWAY DELAY (1)		
		AVERAGE	%TOD
ORIGINAL TOD		1932	100
10/24/00	1428		
10/25/00	1789		
10/31/00	2284		
11/01/00	2670		
11/07/00	1979		
11/14/00	2595		
12/05/00	1921		
12/07/00	1451		
12/12/00	1272		
MODIFIED TOD		1863	96
09/25/01	2212		
09/26/01	2115		
09/27/01	1881		
10/02/01	1702		
10/03/01	1683		
10/04/01	1582		
SWARM 1		1646	85
10/16/01	1475		
10/23/01	1817		
SWARM 2b		1919	99
10/17/01	1887		
10/24/01	1951		
SWARM 1/2b		1606	83
10/18/01	1935		
11/07/01	1276		

**(1) Note:** Data related to 7 Stations: Sierra Madre Villa, Rosemead 2, Michillinda, Baldwin 1, Baldwin 2, Mountain, and Buena Vista, was discarded because of non-availability in one or more testing days.

**TABLE 5.5a1**  
**MODE OF OPERATION (%)**  
**FROM 6:00 AM TO 9:00 AM**

STATION	ORIGINAL TOD						MODIFIED TOD								
	10/24/00	10/25/00	10/31/00	11/01/00	11/07/00	11/14/00	12/05/00	12/07/00	12/12/00	09/25/01	09/26/01	09/27/01	10/02/01	10/03/01	10/04/01
LAKE	94.7	91.7	100.0	97.2	80.6	97.5	97.2	96.9	95.0	93.9	96.7	93.1	93.6	93.6	97.8
HILL	94.4	90.8	98.9	100.0	98.3	80.0	97.5	98.9	96.9	78.3	78.6	86.1	78.1	74.2	80.0
ALTADENA	0.0	0.0	0.0	96.1	80.3	97.5	99.4	98.3	95.6	96.7	98.9	95.0	94.4	94.4	95.3
SAN GABRIEL	10.3	18.1	16.4	11.1	11.9	0.9	28.1	26.4	23.9	94.2	96.4	96.4	94.4	94.4	94.4
SIERRA MADRE VILLA	53.6	55.0	40.3	7.2	92.2	78.6	93.6	98.3	96.1	85.3	83.6	0.3	90.8	7.8	96.9
ROSEMEAD 1	0.0	0.0	0.0	0.0	0.0	80.3	97.8	100.0	98.3	99.7	98.9	99.7	97.5	98.6	77.5
ROSEMEAD 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	97.2	99.7	98.9	99.7	97.8	99.2	99.4
MICHILLINDA	83.9	81.4	87.2	87.8	87.2	69.4	83.6	0.0	3.1	80.8	78.9	83.3	80.8	81.1	63.9
BALDWIN 1	95.0	91.7	100.0	100.0	98.3	80.3	97.8	100.0	98.3	92.5	96.7	99.7	96.9	98.9	78.3
BALDWIN 2	95.0	91.7	100.0	100.0	98.6	80.3	97.8	100.0	98.3	93.1	90.3	87.8	84.2	90.6	86.4
SANTA ANITA 1	95.0	91.4	100.0	100.0	98.9	80.3	97.2	100.0	97.5	99.2	98.3	98.6	91.4	99.2	98.6
SANTA ANITA 2	76.7	86.1	100.0	92.5	66.1	91.4	99.2	98.3	99.7	99.4	98.9	93.6	98.9	93.6	
HUNTINGTON	93.1	88.3	98.6	97.2	98.3	76.1	83.1	81.9	88.9	90.8	85.0	91.1	80.6	90.6	85.8
MYRTLE	86.7	86.1	94.7	93.3	88.3	72.2	90.0	91.9	97.8	88.6	88.6	92.2	73.3	88.9	69.4
MOUNTAIN	88.6	86.9	86.7	88.3	61.4	90.6	91.9	88.1	99.4	99.4	99.7	76.1	0.0	0.0	
BUENA VISTA	95.0	91.7	100.0	100.0	98.9	80.3	97.8	100.0	98.3	99.7	99.4	99.4	97.2	99.2	77.2
MOUNT OLIVE	79.4	79.2	93.9	93.6	94.7	78.1	95.3	87.2	78.3	97.2	99.2	99.4	84.2	98.9	98.6
IRWINDALE 1	94.4	90.8	99.7	99.2	97.8	79.4	97.2	99.7	96.4	95.8	97.2	97.2	94.2	96.4	97.2
IRWINDALE 2	6.1	4.2	5.3	5.8	4.4	3.3	3.6	3.9	74.2	96.1	94.7	94.4	78.3	94.2	95.6
VERNON	93.3	90.6	98.9	98.3	96.4	79.4	97.2	98.6	98.1	97.5	98.3	99.4	82.5	98.6	96.4

TABLE 5.5a2

**MODE OF OPERATION (%)**  
**FROM 6:00 AM TO 9:00 AM**

STATION	ORIGINAL TOD							SWARM 1		SWARM 2b		SWARM 1/2b			
	10/24/00	10/25/00	10/31/00	11/01/00	11/07/00	11/14/00	12/05/00	12/07/00	12/12/00	10/16/01	10/17/01	10/23/01	10/24/01	10/18/01	11/07/01
LAKE	94.7	91.7	100.0	100.0	97.2	80.6	97.5	97.2	96.9	99.7	97.5	97.8	93.9	57.8	57.8
HILL	94.4	90.8	98.9	100.0	98.3	80.0	97.5	98.9	96.9	96.7	98.3	98.3	92.2	61.9	53.9
ALTADENA	0.0	0.0	0.0	0.0	96.1	80.3	97.5	99.4	98.3	73.9	80.3	98.3	92.8	68.1	62.8
SAN GABRIEL	10.3	18.1	16.4	11.1	11.9	0.9	28.1	26.4	23.9	80.3	81.4	92.5	88.6	72.2	66.9
SIERRA MADRE VILLA	53.6	55.0	40.3	7.2	92.2	78.6	93.6	98.3	96.1	67.2	10.3	0.0	93.9	0.0	0.0
ROSEMEAD 1	0.0	0.0	0.0	0.0	0.0	80.3	97.8	100.0	98.3	99.7	98.9	98.6	94.4	96.9	98.3
ROSEMEAD 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	97.2	99.7	98.9	98.9	91.7	99.2
MICHILLINDA	83.9	81.4	87.2	87.8	87.2	69.4	83.6	0.0	3.1	97.2	98.9	79.2	80.6	81.1	0.0
BALDWIN 1	95.0	91.7	100.0	100.0	98.3	80.3	97.8	100.0	98.3	99.2	98.9	96.4	94.4	99.2	98.6
BALDWIN 2	95.0	91.7	100.0	100.0	98.6	80.3	97.8	100.0	98.3	90.6	95.0	91.7	83.9	75.3	89.7
SANTA ANITA 1	95.0	91.4	100.0	100.0	98.9	80.3	97.2	100.0	97.5	98.1	98.9	98.9	94.7	98.6	98.1
SANTA ANITA 2	76.7	86.1	100.0	100.0	92.5	66.1	91.4	99.2	98.3	99.7	98.6	97.8	93.9	98.9	98.6
HUNTINGTON	93.1	88.3	98.6	97.2	98.3	76.1	83.1	81.9	88.9	77.5	80.6	69.2	65.3	66.4	74.7
MYRTLE	86.7	86.1	94.7	93.3	88.3	72.2	90.0	91.9	97.8	85.3	74.2	72.8	61.9	70.6	73.9
MOUNTAIN	88.6	86.9	86.7	86.7	88.3	61.4	90.6	91.9	88.1	99.7	98.9	98.9	94.4	99.2	98.1
BUENA VISTA	95.0	91.7	100.0	100.0	98.9	80.3	97.8	100.0	98.3	99.7	98.9	98.9	94.4	98.9	98.3
MOUNT OLIVE	79.4	79.2	93.9	93.6	94.7	78.1	95.3	87.2	78.3	99.7	98.3	98.6	93.3	98.9	98.1
IRWINDALE 1	94.4	90.8	99.7	99.2	97.8	79.4	97.2	99.7	96.4	93.3	69.4	77.2	66.9	64.7	71.9
IRWINDALE 2	6.1	4.2	5.3	5.8	4.4	3.3	3.6	3.9	74.2	99.2	95.0	99.2	86.7	97.8	96.9
VERNON	93.3	90.6	98.9	98.3	96.4	79.4	97.2	98.6	98.1	97.2	96.9	98.1	92.8	98.9	96.7

**TABLE 5.5b1**  
**QUEUE OVERRIDE (%)**  
**FROM 6:00 AM TO 9:00 AM**

STATION	ORIGINAL TOD						MODIFIED TOD					
	10/24/00	10/25/00	10/31/00	11/01/00	11/07/00	11/14/00	12/05/00	12/07/00	09/25/01	09/26/01	09/27/01	10/03/01
LAKE HILL	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.3	1.4	4.4	5.3	2.8
ALTADENA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.1	20.6	13.3	18.9
SAN GABRIEL	84.2	73.9	83.6	88.9	85.6	78.6	69.4	73.1	74.2	5.3	2.8	3.1
SIERRA MADRE VILLA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	1.9	1.4
ROSEMEAD 1	95.0	91.7	100.0	100.0	98.9	0.0	0.0	0.0	0.0	0.0	0.6	0.0
ROSEMEAD 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MICHILLINDA	11.1	10.3	12.8	12.2	11.7	10.8	14.2	0.0	0.0	16.4	20.3	16.1
BALDWIN 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BALDWIN 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	9.2	11.9
SANTA ANITA 1	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.6	1.1	0.8	0.8
SANTA ANITA 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HUNTINGTON	1.9	3.1	1.1	2.8	0.6	3.9	14.7	17.5	8.9	8.9	14.4	8.3
MYRTLE MOUNTAIN	8.3	5.3	5.3	6.4	10.0	7.5	7.8	7.2	0.0	11.1	10.8	7.5
BUENA VISTA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MOUNT OLIVE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IRWINDALE 1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.6	3.6	1.4
IRWINDALE 2	88.3	87.5	93.1	93.9	93.6	76.4	93.9	95.8	23.9	0.6	1.4	1.1
VERNON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.8	0.0

**TABLE 5.5b  
QUEUE OVERRIDE (%)  
FROM 6:00 AM TO 9:00 AM**

TABLE 5.5c

**AVERAGE QUEUE OVERRIDE (%) FROM 6:00 AM TO 9:00 AM**  
**COMPARISON WITH ORIGINAL TOD MODE AVERAGE QUEUE OVERRIDE**

STATION	ORIGINAL TOD	MODIFIED TOD	SWARM 1		SWARM 2b		SWARM 1/2b	
			%OR TOD	%OR TOD	%OR TOD	%OR TOD	%OR TOD	%OR TOD
LAKE	0.3	3.7	1233	0.3	100	0.3	100	41.0
HILL	0.0	19.5	ND	1.4	ND	0.9	ND	41.1
ALTA DENA	0.2	2.7	1350	21.7	10850	0.6	300	33.4
SAN GABRIEL	79.1	3.7	5	18.2	23	5.6	7	29.4
SIERRA MADRE VILLA	0.0	1.2	ND	5.7	ND	0.0	ND	0.0
ROSEMEAD 1	54.0	0.2	0	0.0	0	0.2	0	1.1
ROSEMEAD 2	0.0	0.0	ND	0.0	ND	0.4	ND	6.4
MICHILLINDA	9.2	16.9	184	0.2	2	16.0	174	9.1
BALDWIN 1	0.0	0.0	ND	0.0	ND	0.0	ND	0.0
BALDWIN 2	0.0	10.1	ND	6.6	ND	8.9	ND	16.4
SANTA ANITA 1	0.0	0.7	ND	0.7	ND	0.0	ND	0.6
SANTA ANITA 2	0.0	0.3	ND	0.2	ND	1.0	ND	0.2
HUNTINGTON	6.1	10.5	172	20.3	333	26.5	434	28.2
MYRTLE	7.2	9.1	126	19.6	272	29.3	407	26.4
MOUNTAIN	0.0	0.1	ND	0.0	ND	0.0	ND	0.0
BUENA VISTA	0.0	0.1	ND	0.0	ND	0.0	ND	0.2
MOUNT OLIVE	0.0	0.0	ND	0.0	ND	0.0	ND	0.0
IRWINDALE 1	0.1	2.3	2300	17.9	17900	24.5	24500	30.4
IRWINDALE 2	82.9	1.5	2	2.3	3	3.8	5	1.7
VERNON	0.0	0.4	ND	0.0	ND	0.0	ND	0.2

**TABLE 5.6**  
**TRAVEL TIME (MINUTES) FROM VERNON TO LAKE**  
**STARTING TIME: 7:30 AM**

<b>MODE</b>	<b>TRAVEL TIME</b>		
		<b>AVERAGE</b>	<b>%TOD</b>
<b>ORIGINAL TOD</b>		<b>36.41</b>	<b>100</b>
10/24/00	28.65		
10/25/00	36.93		
10/31/00	38.47		
11/01/00	41.10		
11/07/00	35.44		
11/14/00	40.06		
12/05/00	38.25		
12/07/00	35.85		
12/12/00	32.98		
<b>MODIFIED TOD</b>		<b>37.17</b>	<b>102</b>
09/25/01	42.31		
09/26/01	40.51		
09/27/01	37.96		
10/02/01	31.40		
10/03/01	36.43		
10/04/01	34.43		
<b>SWARM 1</b>		<b>34.97</b>	<b>96</b>
10/16/01	32.20		
10/23/01	37.74		
<b>SWARM 2b</b>		<b>34.89</b>	<b>96</b>
10/17/01	35.05		
10/24/01	34.72		
<b>SWARM 1/2b</b>		<b>31.48</b>	<b>86</b>
10/18/01	34.20		
11/07/01	28.75		

**TABLE 5.7a1**  
**ON-RAMP VOLUMES (VEHICLES)**  
**FROM 6:00 AM TO 9:00 AM**

STATION	ORIGINAL TOD						MODIFIED TOD					
	10/24/00	10/25/00	10/31/00	11/01/00	11/07/00	11/14/00	12/05/00	12/12/00	09/25/01	09/26/01	10/02/01	10/03/01
LAKE HILL	2817	2770	2836	2816	2865	2779	2826	2045	2785	2744	2710	2608
ALTADENA	1797	1809	1883	1838	1864	1903	1839	1837	1904	1853	1839	1863
SAN GABRIEL	2188	ND	ND	ND	ND	ND	ND	ND	ND	1954	1947	1867
SIERRA MADRE VILLA	1125	1117	1284	ND	1210	1174	1169	1153	1095	1161	1157	ND
ROSEMEAD 1	ND	ND	375	ND	182	540	ND	340	ND	462	465	443
ROSEMEAD 2	ND	ND	ND	ND	ND	ND	2376	2453	2215	2243	2234	2184
MICHILLINDA	1761	1796	1865	1782	1756	1865	1810	ND	1680	1689	1732	1628
BALDWIN 1	ND	ND	ND	ND	ND	ND	ND	ND	ND	1486	1471	1397
BALDWIN 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	973	916	928
SANTA ANITA 1	938	1006	1054	1194	968	1024	1015	1039	964	1038	1035	967
SANTA ANITA 2	1488	1525	1486	1347	1480	1496	1510	1478	1495	1641	1620	1622
HUNTINGTON	1999	2039	1975	1984	1952	1998	1860	1836	1761	1803	1868	1815
MYRTLE MOUNTAIN	1567	1574	1577	1596	1634	1630	1593	1643	1553	1587	1644	1547
BUENA VISTA	762	773	810	769	791	848	820	768	809	793	800	797
MOUNT OLIVE	574	646	593	638	600	565	606	669	672	658	627	591
IRWINDALE 1	996	981	ND	ND	ND	ND	ND	853	476	993	955	907
IRWINDALE 2	1325	1233	1186	1290	1319	1217	1197	1199	1239	ND	ND	ND
VERNON	1071	1101	1117	1143	1122	1098	1114	1104	1149	1156	1163	1093

**TABLE 5.7a2**  
**ON-RAMP VOLUMES (VEHICLES)**

**FROM 6:00 AM TO 9:00 AM**

STATION	ORIGINAL TOD				SWARM 1		SWARM 2b		SWARM 1/2b					
	10/24/00	10/25/00	10/31/00	11/01/00	11/07/00	11/14/00	12/05/00	12/07/00	10/16/01	10/17/01	10/24/01	10/18/01	10/23/01	10/27/01
LAKE	2817	2770	2836	2816	2865	2779	2826	2045	2785	2647	2629	2675	2418	2477
HILL	ND	ND	ND	ND	ND	ND	ND	ND	ND	1175	1213	1173	1227	1191
ALTADENA	1797	1809	1883	1883	1838	1864	1903	1839	1837	1777	1728	1896	1876	1695
SAN GABRIEL	2188	ND	1781	1817	1917	1939	1764							
SIERRA MADRE VILLA	1125	1117	1284	ND	1210	1174	1169	1153	1095	1109	ND	ND	1147	ND
ROSEMEAD 1	ND	ND	375	ND	182	540	ND	340	ND	469	468	562	512	621
ROSEMEAD 2	ND	ND	ND	ND	ND	ND	2376	2453	2215	2181	2160	1935	2074	1832
MICHILLINDA	1761	1796	1865	1782	1756	1865	1810	ND	1680	1734	1670	1754	1758	1764
BALDWIN 1	ND	ND	ND	ND	ND	ND	ND	ND	ND	1398	1466	1457	1479	1418
BALDWIN 2	ND	ND	ND	ND	ND	ND	ND	ND	ND	922	931	965	980	980
SANTA ANITA 1	938	1006	1054	1194	968	1024	1015	1039	964	1053	1036	1030	1052	1014
SANTA ANITA 2	1488	1525	1486	1347	1480	1496	1510	1478	1495	1697	1608	1664	1619	1619
HUNTINGTON	1999	2039	1975	1984	1952	1998	1860	1836	1761	1632	1522	1678	1673	1667
MYRTLE	1567	1574	1577	1596	1634	1630	1593	1643	1553	1569	1573	1539	1638	1582
MOUNTAIN	1023	1089	1105	1175	1143	1136	1152	1186	1119	1110	1077	1097	1105	1133
BUENA VISTA	762	773	810	769	791	848	820	768	809	807	825	832	831	818
MOUNT OLIVE	574	646	593	638	600	565	606	669	672	869	989	623	661	601
IRWINDALE 1	996	981	ND	ND	ND	ND	ND	853	476	792	909	913	877	913
IRWINDALE 2	1325	1233	1186	1290	1319	1217	1197	1199	1239	ND	ND	ND	ND	ND
VERNON	1071	1101	1117	1143	1122	1098	1114	1104	1149	1090	1156	1160	1127	1130

TABLE 5.7b

**AVERAGE ON-RAMP VOLUMES (VEHICLES) FROM 6:00 AM TO 9:00 AM**  
**COMPARISON WITH ORIGINAL TOD MODE AVERAGE VOLUME**

STATION	ORIGINAL TOD	MODIFIED TOD	SWARM 1		SWARM 2b		%OR TOD	
			%OR TOD	%OR TOD	%OR TOD	%OR TOD		
LAKE	2727	2701	99	2637	97	2652	97	2448
HILL	ND	1193	ND	1194	ND	1200	ND	1203
ALTA DENA	1850	1867	101	1753	95	1886	102	1680
SAN GABRIEL	2188	1931	88	1799	82	1928	88	1750
SIERRA MADRE VILLA	1165	1149	99	1109	95	1147	98	ND
ROSEMEAD 1	359	463	129	469	131	537	150	556
ROSEMEAD 2	2348	2223	ND	2171	ND	2005	ND	2017
MICHILLINDA	1789	1670	93	1702	95	1756	98	1764
BALDWIN 1	ND	1464	ND	1432	ND	1468	ND	1441
BALDWIN 2	ND	943	ND	927	ND	973	ND	919
SANTA ANITA 1	1022	1009	99	1045	102	1041	102	1043
SANTA ANITA 2	1478	1661	112	1653	112	1642	111	1650
HUNTINGTON	1934	1829	95	1577	82	1676	87	1724
MYRTLE	1596	1599	100	1571	98	1589	100	1599
MOUNTAIN	1125	1100	98	1094	97	1101	98	1119
BUENA VISTA	794	812	102	816	103	832	105	821
MOUNT OLIVE	618	654	106	929	150	642	104	649
IRWINDALE 1	822	779	95	851	104	895	109	878
IRWINDALE 2	1245	ND	ND	ND	ND	ND	ND	ND
VERNON	1113	1170	105	1123	101	1144	103	1127

**TABLE 5.7c1**  
**ON-RAMP METERED LANE VOLUMES (VEH)**  
**FROM 6:00 AM TO 9:00 AM**

STATION	ORIGINAL TOD				MODIFIED TOD			
	10/24/00	10/31/00	11/01/00	11/07/00	12/05/00	12/12/00	09/25/01	10/02/01
LAKE	2817	2770	2836	2816	2865	2779	2826	2046
HILL	ND	ND	ND	ND	ND	ND	ND	ND
ALTADENA	ND	ND	ND	ND	1513	1489	1559	1453
SAN GABRIEL	1655	1741	1679	1723	1595	1694	1700	1611
SIERRA MAD VILLA	1125	1174	1284	ND	1210	1174	1169	1153
ROSEMEAD 1	ND	ND	ND	ND	ND	ND	ND	ND
ROSEMEAD 2	ND	ND	ND	ND	ND	ND	ND	ND
MICHILLINDA	1761	1796	1865	1782	1756	1865	1810	ND
BALDWIN 1	ND	887	914	888	881	895	972	ND
BALDW/N 2	910	945	924	1030	931	934	935	ND
SANTA ANITA 1	ND	ND	944	ND	ND	842	823	861
SANTA ANITA 2	1488	1525	1486	1347	1480	1496	1510	1478
HUNTINGTON	1565	1562	1581	1551	1578	1584	1465	1400
MYRTLE	1150	1155	1163	1187	1204	1211	1160	1246
MOUNTAIN	505	553	537	575	548	526	544	ND
BUENA VISTA	1139	ND	859	ND	ND	1261	ND	ND
MOUNT OLIVE	ND	ND	418	ND	ND	482	ND	ND
/RW/INDALE 1	1314	1392	1353	1339	1306	1334	1325	1345
/RW/INDALE 2	ND	1569	1291	ND	1767	1328	1490	1388
VERNON	777	736	765	784	760	804	763	831

**Notes:** Ramps printed in italics have HOV by-pass lane

TABLE 5.7c2  
ON-RAMP METERED LANE VOLUMES (VEH)

STATION	ORIGINAL TOD				SWARM 1		SWARM 2b		SWARM 1/2b		
	10/24/00	10/25/00	10/31/00	11/01/00	11/07/00	11/14/00	12/05/00	12/07/00	10/23/01	10/17/01	10/24/01
LAKE	2817	2770	2836	2816	2865	2779	2826	2045	2785	2627	2647
HILL	ND	ND	ND	ND	ND	ND	ND	ND	1175	1213	1173
ALTADENA	ND	ND	ND	ND	ND	1513	1489	1559	1453	1492	1426
SAN GABRIEL	1655	1741	1679	1723	1595	1694	1700	1611	1586	1336	1405
SIERRA MAD VILLA	1125	1174	1284	ND	1210	1174	1169	1153	1095	1109	ND
ROSEMEAD 1	ND	ND	ND	ND	ND	ND	ND	ND	391	ND	462
ROSEMEAD 2	ND	ND	ND	ND	ND	2376	2453	2215	2181	2160	1935
MICHILLINDA	1761	1796	1865	1782	1756	1865	1810	ND	1680	1734	1670
BALDWIN 1	ND	887	914	888	881	895	972	ND	ND	1398	1466
BALDWIN 2	910	945	924	1030	931	934	934	935	ND	912	890
SANTA ANITA 1	ND	ND	944	ND	ND	ND	842	842	823	856	841
SANTA ANITA 2	1488	1525	1486	1347	1480	1496	1510	1478	1495	1697	1608
HUNTINGTON	1565	1562	1581	1551	1578	1584	1465	1400	1351	1297	1164
MYRTLE	1150	1155	1163	1187	1204	1211	1160	1246	1368	1128	1139
MOUNTAIN	505	553	537	575	548	526	544	ND	564	574	567
BUENA VISTA	1139	ND	859	ND	ND	1261	ND	ND	ND	548	581
MOUNT OLIVE	ND	ND	418	ND	ND	482	ND	ND	460	404	676
IRWINDALE 1	1314	1392	1353	1339	1306	1334	1325	1345	1386	1244	1343
IRWINDALE 2	ND	1569	1291	ND	1767	1328	1490	1388	1230	1666	1380
VERNON	777	736	765	784	760	804	763	831	745	689	756

Note: Ramps printed in italics have HOV by-pass lane.

**TABLE 5.7d**  
**ON-RAMP METERED-LANE AVERAGE VOLUMES (VEH)**  
**FROM 6:00 AM TO 9:00 AM**

STATION	OR TOD	MOD TOD	SW 1	SW 2b	SW 1/2b
LAKE	2727	2701	99	2637	97
HILL	ND	1193	ND	1194	ND
ALTA DENA	1501	1516	101	1398	93
SAN GABRIEL	1665	1522	91	1371	82
SIERRA MAD VILLA	1173	1149	98	1109	95
ROSEMEAD 1	ND	415	ND	391	ND
ROSEMEAD 2	2348	2223	95	2171	92
MICHILLINDA	1789	1670	93	1702	95
BALDWIN 1	906	1464	162	1432	158
BALDWIN 2	943	912	97	901	96
SANTA ANITA 1	863	826	96	849	98
SANTA ANITA 2	1478	1661	112	1653	112
HUNTINGTON	1515	1427	94	1231	81
MYRTLE	1205	1158	96	1134	94
MOUNTAIN	544	565	104	571	105
BUENA VISTA	1086	606	56	548	50
MOUNT OLIVE	453	ND	ND	540	119
IRWINDALE 1	1344	1236	92	1294	96
IRWINDALE 2	1438	1466	102	1523	106
VERNON	774	748	97	723	93

**Notes:** Ramps printed in italics have HCV by-pass.

**TABLE 5.8**  
**ON-RAMP QUEUE LENGTHS (VEH)**  
**FROM 6:00 AM TO 9:00 AM**

ON-RAMP	CAPACITY	ORIGINAL TOD			MOD TOD			SWARM 1			SWARM 1/2b		
		11/14/00	11/16/00	11/28/00	12/05/00	12/07/00	12/12/00	12/19/00	01/16/02	% OR TOD	10/23/01	% OR TOD	11/07/01
LAKE	36				40			40	29	73	15	38	ND
HILL	24	28			18	23		26	113	18	78	ND	ND
ALTADENA	22				18		18	19	106	20	111	14	78
SAN GABRIEL	18				14	14	27	193	35	250	35	250	32
MICHILLINDA	16		20			20	23	115	14	70	18	90	90
BALDWIN 2	12		12		12	11	92	13	108	16	133	21	175
HUNTINGTON	22		29			29	36	124	36	124	39	134	36
MYRTLE	10		12			12	14	117	12	100	15	125	15
IRWINDALE 1	16		16			16	24	150	ND	ND	36	225	27
													169

**Notes:** 1. Table shows only ramps with available data.

2. Data for MOD TOD at San Gabriel on-ramp was collected on 1/17/2002.

**TABLE 6.1**  
**COMPARISON OF SWARM MODES TO ORIGINAL TOD MODE (%)**

	<b>SWARM 1</b>	<b>SWARM 2b</b>	<b>SWARM1/2b</b>
MAINLINE VOLUMES	99	97	101
MAINLINE SPEED (6 AM - 9 AM)	109	107	111
MAINLINE SPEED (7:30 AM - 7:45 AM)	107	104	123
MAINLINE OCCUPANCY	90	91	87
FREEWAY DELAY	85	99	83
QUEUE OVERRIDE	3276	2881	6860
TRAVEL TIME	96	96	86
ON-RAMP VOLUMES WITH HOV BY-PASS LANE	96	97	95
ON-RAMP VOLUMES METERED LANE ONLY	92	93	91
ON-RAMP QUEUE LENGTH	110	148	141

**TABLE 6.2**  
**COMPARISON OF SWARM MODES TO MODIFIED TOD MODE (%)**

	<b>SWARM 1</b>	<b>SWARM 2b</b>	<b>SWARM1/2b</b>
MAINLINE VOLUMES	102	100	104
MAINLINE SPEED (6 AM - 9 AM)	100	99	103
MAINLINE SPEED (7:30 AM - 7:45 AM)	99	96	114
MAINLINE OCCUPANCY	98	100	95
FREEWAY DELAY	86	103	84
QUEUE OVERRIDE	549	483	1149
TRAVEL TIME	94	94	84
ON-RAMP VOLUMES WITH HOV BY-PASS LANE	99	100	98
ON-RAMP VOLUMES METERED LANE ONLY	95	95	94
ON-RAMP QUEUE LENGTH	91	123	118

**TABLE 8.1a**

Metering Rate Statistics	
Thu 18-Oct-01	66:38
RMS ID:	716609
County:	LA
Location:	210 W
Postmile:	38.87
Cross Street:	VERNON
LDS ID/Rev:	715518
Status:	Good
Metering Status:	Currently Metering
Metering Mode:	SWARM (1/2b)
Metering Rate:	5 veh/min
Controller Override:	None
% Violations:	0
Metered Lanes:	1
Ramp Lanes:	2
HOV Lane Location:	Left
Meter Head Location:	Right
Platoon Meter Ramp:	No
COMMAND:	Rate (veh/min)
	Metering Mode
	SWARM (1/2b)
Time-of-Day Rate:	5
SWARM 1 (Network) Rate:	5
SWARM 2a (Headway) Rate:	7
SWARM 2b (Storage) Rate:	Greenball
Absolute Minimum Rate:	5
Absolute Maximum Rate:	15
	Details

**TABLE 8.1b**

Metering Rate Statistics	
Thu 18-Oct-01	08:38
RMS ID:	716591
County:	LA
Location:	210 W
Postmile:	28.05
Cross Street:	ALTADENA
LDS ID/Rev:	715533
Status:	Good
Metering Status:	Currently Metering SWARM (1/2b)
Metering Mode:	
Metering Rate:	15 veh/min
Controller Override:	None
% Violations:	0
Metered Lanes:	1
Ramp Lanes:	2
HOV Lane Location:	Left
Meter Head Location:	Right
Platoon Meter Ramp:	No
COMPONENT:	Rate (veh/min) Metering Mode
	SWARM (1/2b)
Time-of-Day Rate:	
SWARM 1 (Network) Rate:	11
SWARM 1 Details...	
SWARM 2a (Headway) Rate:	10
SWARM 2a Details...	
SWARM 2b (Storage) Rate:	6
SWARM 2b Details...	
Absolute Minimum Rate:	15
Absolute Maximum Rate:	5
	Details

**TABLE 8.1c**

Metering Rate Statistics	
Thu 18-Oct-01	07:24
RMS ID:	716608
County:	LA
Location:	210 W
Postmile:	37.92
Cross Street:	IRWINDALE NB
LDS ID/Rev:	715519
Status:	Good
Metering Status:	Currently Metering SWARM (1/2b)
Metering Mode:	
Metering Rate:	15 veh/min
Controller Override:	None
% Violations:	0
Metered Lanes:	1
Ramp Lanes:	1
HOV Lane Location:	None
Meter Head Location:	Right
Platoon Meter Ramp:	No
COMMANDER:	
Rate (veh/ain)	Metering Node
	SWARM (1/2b)
Time-of-Day Rate:	7
SWARM 1 (Network) Rate:	13
SWARM 2a (Headway) Rate:	15
SWARM 2b (Storage) Rate:	13
Absolute Minimum Rate:	5
Absolute Maximum Rate:	15
	Demand

TABLE 8.2a

<b>RAMP METERING REPORT</b>					Metering Rate: 0 Off 1 Greenball	Page: 6
Metering History - Mode and Metering Rate					ND = No Data All values are suspect until verified by Engineer	
					METERING RATE	
					(Vehicles/Minute)	
RMS ID	FREEWAY	PM	NAME	DATE	TIME	REPORTED METERING MODE
716592	LA-210-W	R28.29	SAN GABRIEL	10-16-2001	07:18:00	SWARM 1 15
					07:18:30	SWARM 1 15
					07:19:00	SWARM 1 15
					07:19:30	SWARM 1 15
					07:20:00	SWARM 1 15
					07:20:30	SWARM 1 15
					07:21:00	SWARM 1 15
					07:21:30	SWARM 1 15
					07:22:00	SWARM 1 15
					07:22:30	SWARM 1 11
					07:23:00	SWARM 1 15
					07:23:30	SWARM 1 15
					07:24:00	SWARM 1 10
					07:24:30	SWARM 1 15
					07:25:00	SWARM 1 15
					07:25:30	SWARM 1 15
					07:26:00	SWARM 1 15
					07:26:30	SWARM 1 10
					07:27:00	SWARM 1 8
					07:27:30	SWARM 1 7
					07:28:00	SWARM 1 6
					07:28:30	SWARM 1 5
					07:29:00	SWARM 1 5
					07:29:30	SWARM 1 6
					07:30:00	SWARM 1 5
					07:30:30	Queue Override 6
					07:31:00	SWARM 1 7
					07:31:30	SWARM 1 6
					07:32:00	SWARM 1 6
					07:32:30	SWARM 1 7
					07:33:00	SWARM 1 6

**TABLE 8.2b**

Runtime: 05-07-2002, 07:40

<b>RAMP METERING REPORT</b>				
<b>Metering History - Mode and Metering Rate</b>				
FROM: 10-17-2001 06:00:00	TO: 10-17-2001 09:00:00			

Metering Rate: 0 Off  
1 Greenball  
ND = No Data  
All values are suspect until verified by Engineer

Page: 4

RMS ID	Freeway	PM	NAME	DATE	TIME	REPORTED METERING MODE		METERING RATE (Vehicle(s)/Minute)
						SWARM	2B	
716592	LA-210-W	R28.29	SAN GABRIEL	10-17-2001	06:47:00	SWARM	2B	15
					06:47:30	SWARM	2B	15
					06:48:00	SWARM	2B	15
					06:48:30	SWARM	2B	15
					06:49:00	SWARM	2B	15
					06:49:30	SWARM	2B	15
					06:50:00	SWARM	2B	15
					06:50:30	SWARM	2B	15
					06:51:00	SWARM	2B	15
					06:51:30	SWARM	2B	15
					06:52:00	SWARM	2B	15
					06:52:30	SWARM	2B	1
					06:53:00	SWARM	2B	1
					06:53:30	SWARM	2B	1
					06:54:00	ND		ND
					06:54:30	SWARM	2B	1
					06:55:00	SWARM	2B	1
					06:55:30	SWARM	2B	1
					06:56:00	SWARM	2B	1
					06:56:30	SWARM	2B	1
					06:57:00	SWARM	2B	1
					06:57:30	SWARM	2B	1
					06:58:00	SWARM	2B	6
					06:58:30	SWARM	2B	6
					07:00:00	SWARM	2B	7
					07:00:30	SWARM	2B	9
					07:01:00	SWARM	2B	15
					07:01:30	SWARM	2B	15
					07:02:00	SWARM	2B	15

TABLE 8.2C

RAMP METERING REPORT							
Metering History - Mode and Metering Rate							
FROM: 11-07-2001 06:00:00		TO: 11-07-2001 09:00:00					
ND = No Data All values are suspect until verified by Engineer							
<b>METERING RATE</b> <b>(Vehicles/Minute)</b>							

RMS ID	FREWAY	PM	NAME	DATE	TIME	REPORTED METERING MODE
716592	LA-210-W	R28.29	SAN GABRIEL	11-07-2001	07:49:00	SWARM 1/2B
					07:49:30	Queue Override
					07:50:00	Queue Override
					07:50:30	Queue Override
					07:51:00	Queue Override
					07:51:30	Queue Override
					07:52:00	Queue Override
					07:52:30	Queue Override
					07:53:00	SWARM 1/2B
					07:53:30	SWARM 1/2B
					07:54:00	SWARM 1/2B
					07:54:30	SWARM 1/2B
					07:55:00	SWARM 1/2B
					07:55:30	SWARM 1/2B
					07:56:00	SWARM 1/2B
					07:56:30	SWARM 1/2B
					07:57:00	SWARM 1/2B
					07:57:30	Queue Override
					07:58:00	Queue Override
					07:58:30	Queue Override
					07:59:00	SWARM 1/2B
					07:59:30	Queue Override
					08:00:00	Queue Override
					08:00:30	SWARM 1/2B
					08:01:00	SWARM 1/2B
					08:01:30	SWARM 1/2B
					08:02:00	SWARM 1/2B
					08:02:30	SWARM 1/2B
					08:03:00	SWARM 1/2B
					08:03:30	SWARM 1/2B
					08:04:00	SWARM 1/2B

Runtime: 05-07-2002, 07:08

Metering Rate: 0 Off  
1 Greenball

Page: 8

ND = No Data

All values are suspect until verified by Engineer

**TABLE 8.3a1**

RMS Control	
Tue 16-Oct-01	08:30
RMS ID: 716609 County: LA Location: 210 W Postmile: 38.87 Cross Street: VERNON LDS ID/Rev: 716618	Metering Status: Currently Metering SWARM (1) Metering Mode: 15 veh/min Metering Rate: None Controller Override: % Violations: 0
Tue 16-Oct-01	08:30
RMS ID: 716608 County: LA Location: 210 W Postmile: 37.92 Cross Street: IRWINDALE NB LDS ID/Rev: 716610	Metering Status: Currently Metering SWARM (1) Metering Mode: 15 veh/min Metering Rate: None Controller Override: % Violations: 0
Tue 16-Oct-01	08:30
RMS ID: 716607 County: LA Location: 210 W Postmile: 37.78 Cross Street: IRWINDALE SB LDS ID/Rev: 716620	Metering Status: Currently Metering SWARM (1) Metering Mode: 15 veh/min Metering Rate: None Controller Override: % Violations: 0
Tue 16-Oct-01	08:30
RMS ID: 716881 County: LA Location: 210 W Postmile: 36.30 Cross Street: MOUNT OLIVE LDS ID/Rev: 716521	Metering Status: Currently Metering SWARM (1) Metering Mode: 6 veh/min Metering Rate: None Controller Override: % Violations: 0
Tue 16-Oct-01	08:30
RMS ID: 718211 County: LA Location: 210 W Postmile: 35.12 Cross Street: BUENA Vista LDS ID/Rev: 715522 Status: Good	Metering Status: Currently Metering SWARM (1) Metering Mode: 15 veh/min Metering Rate: None Controller Override: % Violations: 0 Metred Lanes: 1 Ramp Lanes: 2 HOV Lane Location: Left

**TABLE 8.3a2**

Adjacent VDS Data: Speed / 30 - Second Volume									
Tue 16 Oct -01		I-210-4		Date at:		Oct 16 08:29:00		08:29	
Freeway:				Freeze Data		Date Display			
VERNON R38.87		IRVINDALE 2 R37.92		IRVINDALE 1 R37.78		MOUNT OLIVE R36.30		BEINA VISTA R35.12	
Lane	Speed	Vol	Speed	Vol	Speed	Vol	Speed	Vol	Speed
HOV1	70	5	70	7	70	0	70	0	42
1	67	19	69	13	70	0	5	6	11
2	67	23	3	6	70	0	9	6	6
3	48	15	57	9	51	15	6	1	2
4	52	16	70	11	64	19	6	5	7
Average:	59.7	18.2	66.2	11.0	58.0	17.0	6.3	5.8	8.2
Status:	All Loops Good	Same Loops Bad	Some Loops Bad	Some Loops Bad	All Loops Good	All Loops Good	All Loops Good	All Loops Good	All Loops Good
					Speed = MPH	Vol = Veh / 30 Sec			
						Dismiss			

**TABLE 8.3b1**

RMS Control							
Tue 23-Oct-01	09:15						
RMS ID:	716609	County:	LA	Metering Status:	Currently Metering SWARM (1)		
Location:	210 W	Postmile:	38.87	Metering Mode:	12 veh/min		
Cross Street:	VERNON	Controller Override:	None	% Violations:	0		
LDS ID/Rev:	715518						
Tue 23-Oct-01	09:15						
RMS ID:	716608	County:	LA	Metering Status:	Currently Metering SWARM (1)		
Location:	210 W	Postmile:	37.92	Metering Mode:	15 veh/min		
Cross Street:	IRWINDALE NB	Controller Override:	None	% Violations:	0		
LDS ID/Rev:	715519						
Tue 23-Oct-01	09:15						
RMS ID:	716607	County:	LA	Metering Status:	Currently Metering SWARM (1)		
Location:	210 W	Postmile:	37.78	Metering Mode:	15 veh/min		
Cross Street:	IRWINDALE SB	Controller Override:	None	% Violations:	0		
LDS ID/Rev:	715520	Statute:	Good				
Tue 23-Oct-01	09:15						
RMS ID:	716881	County:	LA	Metering Status:	Currently Metering SWARM (1)		
Location:	210 W	Postmile:	36.30	Metering Mode:	5 veh/min		
Cross Street:	MOUNT OLIVE	Controller Override:	None	% Violations:	0		
LDS ID/Rev:	715521	Statute:	Good				
Tue 23-Oct-01	09:15						
RMS ID:	718211	County:	LA	Metering Status:	Currently Metering SWARM (1)		
Location:	210 W	Postmile:	35.12	Metering Mode:	15 veh/min		
Cross Street:	BUENA VISTA	Controller Override:	None	% Violations:	0		
LDS ID/Rev:	715522	Status:	Good	Metered Lanes:	1		

TABLE 8.3b2

**TABLE 8.3c1**

RMS Control							
Tue 16-Oct-01	07:45						
RMS ID:	761366	Metering Status:	Currently Metering SWARM (1)				
County:	LA	Metering Mode:	5 veh/min				
Location:	210 W	Metering Rate:	None				
Postmile:	34.61	Controller Override:	None				
Cross Street:	MOUNTAIN	% Violations:	0				
LDS ID/Rev:	71FF23	RMS Control	07:45				
Tue 16-Oct-01	07:45						
RMS ID:	718208	Metering Status:	Currently Metering SWARM (1)				
County:	LA	Metering Mode:	7 veh/min				
Location:	210 W	Metering Rate:	None				
Postmile:	33.76	Controller Override:	0				
Cross Street:	MYRTLE	% Violations:	0				
LDS ID/Rev:	715524	RMS Control	07:45				
Tue 16-Oct-01	07:45						
RMS ID:	718206	Metering Status:	Currently Metering SWARM (1)				
County:	LA	Metering Mode:	15 veh/min				
Location:	210 W	Metering Rate:	None				
Postmile:	32.76	Controller Override:	0				
Cross Street:	HUNTINGTON 1	% Violations:	0				
LDS ID/Rev:	715525	RMS Control	07:45				
Tue 16-Oct-01	07:45						
RMS ID:	717107	Metering Status:	Currently Metering SWARM (1)				
County:	LA	Metering Mode:	30 veh/min				
Location:	210 W	Metering Rate:	None				
Postmile:	31.91	Controller Override:	0				
Cross Street:	SANTA ANITA NB	% Violations:	0				
LDS ID/Rev:	715526	RMS Control	07:45				
Tue 16-Oct-01	07:45						
RMS ID:	716604	Metering Status:	Currently Metering SWARM (1)				
County:	LA	Metering Mode:	6 veh/min				
Location:	210 W	Metering Rate:	None				
Postmile:	31.73	Controller Override:	0				
Cross Street:	SANTA ANITA SB	% Violations:	0				
LDS ID/Rev:	715527	Status:	Good				

TABLE 8.3c2

**TABLE 8.3d1**

RMS Control					
Wed 07-Nov-01					06:15
RMS ID:	716586	Metering Status:	Currently Metering SWARM (1/2b) 10 veh/min		
County:	LA	Metering Mode:			
Location:	210 W	Metering Rate:			
Postmile:	26.14	Controller Override:	None		
Cross Street:	LAKE 1				
LDS ID					
Status:					
RMS Control					
Wed 07-Nov-01					06:15
RMS ID:	716588	Metering Status:	Currently Metering SWARM (1/2b) 10 veh/min		
County:	LA	Metering Mode:			
Location:	210 W	Metering Rate:			
Postmile:	26.82	Controller Override:	None		
Cross Street:	HILL				
LDS ID					
Status:					
RMS Control					
Wed 07-Nov-01					06:15
RMS ID:	716591	Metering Status:	Currently Metering SWARM (1/2b) 5 veh/min		
County:	LA	Metering Mode:			
Location:	210 W	Metering Rate:			
Postmile:	28.05	Controller Override:	None		
Cross Street:	ALTADENA				
LDS ID/R#					
Status:					
RMS Control					
Wed 07-Nov-01					06:15
RMS ID:	716592	Metering Status:	Currently Metering SWARM (1/2b) 15 veh/min		
County:	LA	Metering Mode:			
Location:	210 W	Metering Rate:			
Postmile:	28.29	Controller Override:	None		
Cross Street:	SAN GABRIEL				
Conf:					
LDS ID/R#					
Status:					
RMS Control					
Wed 07-Nov-01					06:15
RMS ID:	716594	Metering Status:	Not Currently Metering Local: TOD Off		
County:	LA	Metering Mode:			
Location:	210 W	Metering Rate:			
Postmile:	29.19	Controller Override:	None		
Cross Street:	SIERRA MADRE V1	% Violations:	0		
OR		Metered Lanes:	1		
PA		Ramp Lanes:	1		
DM		HOV Lane Location:	None		
QU		RMS T			
RMS Type:		Select Metering Mode...			
Loop Type:					
OR					
PA					
DM					
QU					
RH					

TABLE 8.3d2

## **APPENDIXES**

### **1. ABBREVIATIONS**

### **2. TABLES**

TABLES A5.1.1a, b, c, d to  
TABLES A5.1.20a, b, c, d

Mainline Data (Volume, Occupancy, Speed)

TABLE A5.6.1 to  
TABLE A5.6.21

Travel Time

## ABBREVIATIONS

AM	Ante Meridiem (period between midnight and noon)
ATMS	Advanced Transportation Management System
Aver	Average
EB or E/B	Eastbound
GB	Green Ball
HOV	High Occupancy Vehicle
LOS	Level Of Service
M	Currently Metering
ML	Mainline
MOD TOD	Modified TOD
mph	miles per hour
NB or N/B	Northbound
NET	National Engineering Technology
NM	Not Currently Metering
Occ	Occupancy
OR TOD	Original TOD
PM	Post Mile
Q	Queue
QO	Queue Override
RMS	Ramps
S	Speed
SATMS	Semi-Automatic Traffic Management System
SB or S/B	Southbound
SWARM	System Wide Adaptive Ramp Metering
TMC	Transportation Management Center
TOD	Time Of Day
V	Volume
Veh	Vehicles
VDS	Vehicle Detection Station
vphpl	vehicles per hour per lane (v/h/l)
vpmpl	vehicles per minute per lane (v/m/l)
WB or W/B	Westbound



**TABLE A5.1.1b**  
**MAINLINE @ LAKE, W/B LA-210, PM R 26.14**

Time	11/14/00			12/05/00			12/07/00			12/12/00		
	Volume C/O	Speed C/O										
6:00-6:15	3110	15.7	51	2028	6.9	67	2132	9.6	61	1881	9.2	54
6:15-6:30	2203	25.5	42	2398	8.4	65	2575	12.3	57	1782	20.6	47
6:30-6:45	2273	23.5	45	2553	8.9	65	2630	11.8	59	2380	9.7	60
6:45-7:00	2580	11.1	54	2688	9.5	64	2133	29.3	57	2430	9.6	61
7:00-7:15	2817	18.2	43	2605	9.2	65	2633	9.8	63	2100	21.4	46
7:15-7:30	2790	20.0	39	2753	11.5	54	2710	11.6	53	2733	12.3	55
7:30-7:45	2390	27.2	36	2608	13.5	44	2875	18.3	44	2790	14.6	47
7:45-8:00	2458	23.9	37	2528	15.5	38	2075	30.9	35	2726	17.1	44
8:00-8:15	2618	13.8	43	2460	11.4	49	2295	24.2	42	2610	15.3	47
8:15-8:30	2615	13.7	43	2036	23.5	44	2733	12.1	52	2484	17.9	45
8:30-8:45	2450	17.6	39	2071	22.7	37	2603	11.3	53	2490	12.2	51
8:45-9:00	2090	26.3	36	2453	10.7	52	2640	11.1	54	2378	10.4	56
<b>Total Volume</b>	<b>30394</b>			<b>29160</b>			<b>30094</b>			<b>28784</b>		
Aver Occ	19.7			12.6			16.0			14.2		
Aver Speed		43			54			53		51		

**TABLE A5.1.1c**  
**MAINLINE @ LAKE, W/B LA-210, PM R 26.14**

MOD TOD																		
	9/25/01			9/26/01			9/27/01			10/02/01			10/03/01			10/04/01		
Time	Volume	Speed	Occ															
6:00-6:15	2026	8.8	61	2023	8.8	61	2006	9.0	60	2039	8.9	61	1941	8.0	64	2139	13.0	56
6:15-6:30	2315	10.1	60	2273	10.3	59	2254	10.3	59	2182	9.8	59	2182	9.3	61	1903	10.6	54
6:30-6:45	2342	9.7	63	2369	10.0	63	2347	10.4	60	2311	10.6	58	2396	10.6	59	1944	11.3	52
6:45-7:00	2394	10.7	59	2416	11.0	59	2461	10.6	61	2465	10.9	60	2478	10.6	61	1928	13.2	44
7:00-7:15	2471	12.8	51	2429	12.6	50	2423	11.6	55	2361	12.3	55	2338	13.1	52	1700	12.8	45
7:15-7:30	2407	13.4	47	2545	12.7	53	2415	12.8	50	2550	12.7	53	2598	14.4	48	1748	16.5	48
7:30-7:45	2406	13.9	46	2397	14.1	46	2395	13.2	49	2567	13.9	49	2561	14.3	48	1778	12.5	49
7:45-8:00	2463	14.1	47	2486	14.3	46	2493	13.7	48	2550	14.1	48	2600	14.6	47	1865	18.7	33
8:00-8:15	2461	13.0	50	2491	13.4	49	2378	15.2	43	2478	13.6	49	2487	14.8	45	1366	23.1	19
8:15-8:30	2400	13.2	48	2386	12.4	51	2251	13.7	45	2511	13.0	51	2484	14.3	46	1521	21.4	23
8:30-8:45	2320	12.8	48	2338	13.3	47	2295	13.3	46	2370	13.1	49	2479	14.4	45	1636	18.2	30
8:45-9:00	2308	14.1	44	2349	12.9	48	2307	13.7	44	2275	13.1	48	2331	13.1	49	1455	21.6	22
<b>Total Volume</b>	<b>28313</b>			<b>28502</b>			<b>28025</b>			<b>28859</b>			<b>29065</b>			<b>20933</b>		
<b>Aver Occ</b>	12.2			12.2			12.3			12.2			12.6			16.1		
<b>Aver Speed</b>	52			53			52			53			52			41		

TABLE A5.1.1d

## MAINLINE @ LAKE, W/B LA-210, PM R 26.14

SWARM 1				SWARM 2b				SWARM 1/2b			
10/16/01		10/23/01		10/17/01		10/24/01		10/18/01		11/07/01	
Time	Volume CC	Speed CC	Volume CC								
6:00-6:15	1966	8.3	1996	8.3	1924	8.2	62	2050	8.6	62	2002
6:15-6:30	2245	10.3	58	2276	10.0	60	2231	9.4	62	2249	9.8
6:30-6:45	2371	10.7	59	2396	10.9	58	2344	10.1	61	2284	9.8
6:45-7:00	2508	11.4	58	2464	11.0	59	2441	10.5	61	2442	10.8
7:00-7:15	2487	11.5	57	2420	10.7	59	2554	11.3	59	2581	4.0
7:15-7:30	2550	14.1	48	2636	12.8	54	2499	12.9	51	2443	14.6
7:30-7:45	2489	14.3	47	2446	13.2	50	2481	13.7	48	2476	14.4
7:45-8:00	2604	14.9	46	2513	15.5	43	2496	13.2	50	2611	15.2
8:00-8:15	2582	14.0	49	2414	14.7	43	2465	13.5	48	2516	14.2
8:15-8:30	2629	13.5	50	2438	14.7	44	2463	13.5	48	2572	13.7
8:30-8:45	2442	13.9	48	2433	14.4	45	2417	12.3	52	2447	13.4
8:45-9:00	2078	9.8	56	2391	14.0	46	2312	12.1	51	2347	13.0
Total Volume	28851		28823		28627		28998		27718		29539
Aver Occ		12.2		12.5		11.7		11.8		11.6	
Aver Speed		53		52		54		52		53	

**TABLE A5.1.2a**  
**MAINLINE @ HILL, W/B LA-210, PM R 26.82**

Time	10/24/00			10/25/00			10/31/00			11/01/00			11/07/00		
	Volume	Occ	Speed												
6:00-6:15	1825	17.7	41	1618	22.4	42	1418	31.7	35	1738	24.4	43	1403	32.0	46
6:15-6:30	2200	10.6	52	1900	21.5	40	1530	38.4	48	2043	21.2	41	2405	11.3	54
6:30-6:45	1673	31.5	40	1753	25.5	40	2605	10.5	56	1493	41.4	50	1760	25.3	41
6:45-7:00	1433	41.2	50	1915	26.4	37	2580	10.6	56	1258	44.6	56	1590	37.2	48
7:00-7:15	1863	31.4	38	1403	45.0	51	1838	29.0	41	1508	40.6	46	1948	25.6	38
7:15-7:30	2690	12.5	49	2795	16.2	39	1658	38.9	30	2530	16.4	35	2610	12.3	48
7:30-7:45	2625	17.7	34	2710	13.1	47	2475	11.9	48	1778	35.8	21	2465	17.5	32
7:45-8:00	2520	12.3	47	2475	17.8	32	1578	37.2	36	1595	41.5	21	1638	37.1	28
8:00-8:15	2450	11.6	48	1385	44.1	34	1225	45.6	49	2435	20.1	28	1235	47.3	37
8:15-8:30	2575	12.0	49	2535	13.7	42	2420	11.4	49	2390	17.9	31	2390	17.5	31
8:30-8:45	2440	14.8	38	2545	14.0	41	2170	10.1	49	2425	18.1	31	2370	15.7	34
8:45-9:00	2505	15.6	37	2390	17.0	32	2140	10.0	49	1490	36.9	28	2270	10.5	49
Total Volume	26799			25424			23637			22683			24084		
Aver Occ	19.1			23.1			23.8			29.9			24.1		
Aver Speed	44			40			47			35			41		

**MAINLINE @ HILL, W/B LA-210, PM R 26.82**

**TABLE A5.1.2b**

Time	11/14/00			12/05/00			OR TOD			12/12/00		
	Volume	Occ	Speed									
6:00-6:15	1575	31.2	44	1955	8.6	55	1407	26.7	35	1327	25.0	33
6:15-6:30	1688	29.4	41	1643	30.5	46	1608	30.0	37	1660	22.8	35
6:30-6:45	1463	40.5	46	2385	14.7	45	1915	21.7	36	1500	32.4	35
6:45-7:00	1328	44.8	54	2323	20.7	40	1770	34.5	37	1945	27.3	44
7:00-7:15	1423	41.7	49	2535	9.6	60	1683	29.9	47	2200	20.2	41
7:15-7:30	2590	11.9	50	2753	25.6	33	1487	37.3	26	1640	35.1	46
7:30-7:45	2590	18.0	33	2608	39.3	21	1793	34.5	26	1898	30.5	39
7:45-8:00	2565	20.4	29	2528	49.4	30	1405	42.7	21	1727	35.0	24
8:00-8:15	2440	15.7	35	2460	33.0	26	1712	37.3	19	1793	32.4	29
8:15-8:30	2390	16.3	33	2035	30.6	25	2428	24.2	25	1950	31.6	32
8:30-8:45	2390	16.3	33	2071	12.4	46	1790	33.1	34	1795	34.4	37
8:45-9:00	2420	14.6	38	2453	21.7	30	2620	14.1	42	1595	35.4	45
<b>Total Volume</b>	<b>24862</b>			<b>27749</b>			<b>21618</b>			<b>21030</b>		
Aver Occ	25.1			24.7			30.5			30.2		
Aver Speed		39			38			32			37	

**MAIN-LINE @ HLL: W/B LA-2110, PM R 26.82**

MOD TOD								
09/25/01		09/26/01		09/27/01		10/02/01		
Time	Volume	Speed	Volume	Speed	Volume	Speed	Volume	
6:00-6:15	1784	6.6	69	1866	6.9	69	1833	6.7
6:15-6:30	1979	7.4	68	1971	7.3	69	1906	7.2
6:30-6:45	2050	7.5	70	2103	7.9	68	2108	7.8
6:45-7:00	2160	8.3	66	2077	7.9	67	2149	8.2
7:00-7:15	2142	8.9	61	2083	8.5	63	2118	8.6
7:15-7:30	2105	12.9	43	2234	9.4	61	2064	8.7
7:30-7:45	2110	14.6	39	2165	13.3	43	2118	9.7
7:45-8:00	2165	14.6	40	2234	15.6	38	2163	13.0
8:00-8:15	2099	13.7	40	2138	12.9	43	2127	12.9
8:15-8:30	2120	13.6	41	2161	12.9	43	2006	12.7
8:30-8:45	1994	14.1	37	2059	13.3	40	2057	14.9
8:45-9:00	2159	11.6	48	2081	9.5	56	2013	14.1
<b>Total Volume</b>	<b>24837</b>		<b>25172</b>		<b>24662</b>		<b>25300</b>	
Aver Occ	11.2		10.5		10.4		8.8	
Aver Speed	52		55		54		62	
Speed	6.6		6.6		6.6		10.2	
CC	56		56		56		56	
OC	70		70		70		70	
Speed	1829		1829		1829		1829	
CC	7.9		7.9		7.9		7.9	
OC	65		65		65		65	
Speed	2011		2011		2011		2011	
CC	7.8		7.8		7.8		7.8	
OC	68		68		68		68	
Speed	2099		2099		2099		2099	
CC	7.8		7.8		7.8		7.8	
OC	68		68		68		68	
Speed	2235		2235		2235		2235	
CC	8.8		8.8		8.8		8.8	
OC	66		66		66		66	

TABLE A5.1.2d

MAIN LINE @ HILL W/B LA-210. PM R 26.82

SWARM 1		SWARM 2b				SWARM 1/2b					
10/16/01		10/23/01		10/17/01		10/24/01		10/18/01		11/7/01	
Time	Volume OCC	Speed OCC	Speed								
6:00-6:15	1797	6.6	70	1705	9.6	58	1686	6.2	69	1683	6.3
6:15-6:30	1971	7.7	66	1994	7.6	67	2004	7.5	68	2021	7.6
6:30-6:45	2127	8.1	67	2087	8.1	66	2007	8.0	66	1973	7.4
6:45-7:00	2156	8.1	88	2228	8.5	67	2080	7.7	69	2199	8.2
7:00-7:15	2216	8.8	64	2159	8.3	66	2314	9.0	66	2247	8.9
7:15-7:30	2290	11.6	51	2326	9.4	63	2178	10.8	35	2226	13.4
7:30-7:45	2184	12.7	45	2229	10.3	55	2201	14.0	42	2168	13.3
7:45-8:00	2264	13.9	42	2272	15.0	40	2231	13.1	44	2383	14.8
8:00-8:15	2314	10.8	55	2162	15.2	37	2164	11.6	48	2201	12.8
8:15-8:30	2234	10.9	53	2153	15.3	37	2011	10.3	51	2344	12.2
8:30-8:45	2184	10.1	55	2058	11.5	47	2160	9.4	59	2211	10.9
8:45-9:00	1761	6.9	65	2187	10.5	53	2086	9.0	59	2141	11.5
Total Volume	25498		25570		25122		25797		24661		26454
Aver Occ	9.7		10.8		9.7		10.6		11.5		10.2
Aver Speed	58		55		56		56		55		58

**TABLE A5.1.3a**  
**MAINLINE @ ALTADENA, W/B LA-210, PM R 28.05**

Time	10/24/00			10/25/00			10/31/00			11/01/00			11/07/00			
	Volume	OCC	Speed													
6:00-6:15	2159	10.9	50	2164	10.9	50	2107	11.0	50	2190	11.6	50	2135	10.8	50	
6:15-6:30	2258	12.0	48	2277	12.3	47	2389	13.4	48	2373	13.7	47	2322	12.2	49	
6:30-6:45	2342	13.6	45	2352	13.0	47	2407	12.8	49	2499	13.5	48	2373	13.0	47	
6:45-7:00	2406	13.8	45	2632	14.1	47	2524	14.1	47	2462	13.6	47	2557	13.5	49	
7:00-7:15	2510	16.7	40	2591	15.6	44	2532	16.8	40	2601	14.5	45	2427	16.0	40	
7:15-7:30	2572	19.3	35	2542	20.7	33	2476	22.3	29	2392	22.2	28	2456	21.9	30	
7:30-7:45	2407	23.1	28	2435	22.5	29	2272	25.6	24	2261	25.0	24	2283	24.3	25	
7:45-8:00	2249	25.4	24	2361	24.1	26	2376	23.8	27	2166	26.2	22	2299	23.7	26	
8:00-8:15	2367	21.9	29	2385	22.6	28	2333	22.9	28	2220	24.6	24	2377	22.2	29	
8:15-8:30	2335	22.7	28	2353	22.5	28	2243	23.9	26	2162	25.3	23	2212	24.1	24	
8:30-8:45	2364	21.5	30	2372	22.0	29	2186	24.5	24	2296	22.9	27	2239	24.9	24	
8:45-9:00	2399	20.1	32	2328	22.3	29	2066	25.7	22	2223	23.3	26	2249	21.2	29	
Total Volume	<b>28368</b>			<b>28692</b>			<b>27911</b>			<b>27745</b>			<b>27929</b>			
Aver OCC		<b>18.4</b>			<b>18.6</b>			<b>19.7</b>			<b>19.7</b>			<b>19.0</b>		
Aver Speed			<b>36</b>			<b>36</b>			<b>35</b>			<b>35</b>			<b>35</b>	

**MAINLINE @ ALTADENA, W/B LA-210, PM R 28.05**

**TABLE A5.1.3b**

Time	OR TOD			12/12/00		
	11/14/00	12/05/00	12/07/00	12/07/00	12/07/00	12/12/00
Volume	Speed	Speed	Volume	Speed	Speed	Speed
Time	CC	CC	CC	CC	CC	CC
6:00-6:15	2221	11.4	49	2015	9.5	56
6:15-6:30	2305	11.8	50	2241	10.7	55
6:30-6:45	2224	11.7	49	2401	11.8	54
6:45-7:00	2494	13.1	49	2523	13.2	51
				2656	12.7	55
7:00-7:15	2542	14.0	47	2490	12.3	53
7:15-7:30	2569	18.0	37	2509	17.2	39
7:30-7:45	2486	23.5	29	2238	22.7	27
7:45-8:00	2216	25.2	24	2261	22.3	28
				2323	24.2	26
8:00-8:15	2257	23.8	26	2149	23.5	25
8:15-8:30	2245	24.0	25	2215	22.1	28
8:30-8:45	2180	24.7	24	2262	20.2	31
8:45-9:00	2289	22.3	28	2288	20.0	32
				2354	22.0	30
Total Volume	28027		27592		28577	
Aver Occ	18.6		17.1		17.5	
Aver Speed	37		40		40	
						40

**TABLE A5.1.3c**  
**MAINLINE @ ALTADENA, W/B LA-210, PM R 28.05**

Time	9/25/01			9/26/01			9/27/01			10/02/01			10/03/01			10/04/01		
	Volume OC	Speed OC	Volume OC	Volume OC	Speed OC	Volume OC	Speed OC	Volume OC	Speed OC									
6:00-6:15	2038	9.1	58	2099	9.4	58	2099	9.3	58	2039	9.1	58	1985	8.6	58	2039	9.0	58
6:15-6:30	2329	11.1	56	2240	10.1	57	2200	9.9	58	2185	10.1	56	2211	10.1	56	2153	9.7	57
6:30-6:45	2346	11.9	51	2392	11.4	55	2382	11.7	52	2270	10.4	56	2367	11.5	53	2317	10.7	56
6:45-7:00	2404	14.6	44	2394	13.9	45	2445	12.9	50	2490	11.8	55	2522	11.8	55	2483	12.7	50
7:00-7:15	2344	14.7	42	2304	19.2	33	2344	15.7	40	2505	13.7	48	2502	16.3	41	2422	12.0	53
7:15-7:30	2343	18.5	35	2369	18.8	34	2348	16.5	38	2387	19.8	32	2565	18.4	38	2457	12.5	52
7:30-7:45	2243	20.8	29	2323	20.5	30	2214	22.0	28	2376	19.0	33	2279	21.5	29	2398	17.1	37
7:45-8:00	2103	22.9	24	2239	20.5	29	2254	21.8	28	2290	21.2	30	2300	21.5	29	2200	23.4	25
8:00-8:15	2175	21.7	27	2214	22.1	27	2283	19.4	32	2279	20.7	30	2406	19.4	34	2359	21.3	30
8:15-8:30	2222	21.3	28	2298	19.4	31	2040	23.5	23	2362	19.9	32	2259	22.2	28	2320	20.4	32
8:30-8:45	2252	20.8	29	2227	21.4	28	2272	20.1	30	2354	19.6	32	2349	20.7	31	2433	19.4	34
8:45-9:00	2345	20.1	32	2201	21.3	28	2081	22.2	25	2219	19.6	30	2217	20.6	30	2255	19.7	31
Total Volume	<b>27144</b>		<b>27300</b>			<b>26962</b>		<b>27747</b>		<b>27752</b>			<b>27836</b>					
Aver Occ	17.3		17.3			17.1		16.2		16.2			16.8		15.7			
Aver Speed	38		38			39		41		40			42		43			

TABLE A5.1.3d

**MAINLINE @ ALTADENA, WIB LA-210, PM R28.05**

Time	SWARM 1			SWARM 2b			SWARM 1/2b		
	10/16/01	10/23/01	10/17/01	10/24/01	10/18/01	11/07/01	Volume CC	Speed CC	Volume CC
6:00-6:15	2001	9.0	68	2035	8.7	60	1950	8.8	57
6:15-6:30	2228	10.3	56	2219	10.0	57	2192	10.3	55
6:30-6:45	2322	11.2	55	2344	11.0	55	2386	11.2	55
6:45-7:00	2488	11.8	55	2469	11.9	54	2462	12.7	51
7:00-7:15	2497	16.7	40	2393	11.6	54	2529	12.4	53
7:15-7:30	2430	19.0	34	2431	15.1	44	2340	17.6	35
7:30-7:45	2255	22.5	27	2368	19.8	33	2436	19.7	33
7:45-8:00	2376	21.4	30	2436	19.2	34	2145	21.4	26
8:00-8:15	2370	20.5	32	2251	21.1	28	2304	20.2	31
8:15-8:30	2427	19.5	34	2225	22.5	26	2152	21.1	28
8:30-8:45	2291	19.1	33	2320	19.3	33	2253	20.8	30
8:45-9:00	1840	26.9	20	2341	20.4	32	2308	19.4	33
Total Volume	27525		27832		27457		27672		27074
Aver Occ		17.3		15.9		16.3		16.2	
Aver Speed			40		42		41		41
									44

**TABLE A5.1.4a**  
**MAINLINE @ SAN GABRIEL, W/B LA-210, PM R28 29**

Time	10/24/00			10/25/00			10/31/00			11/01/00			11/07/00		
	Volume	Speed	Occ												
6:00-6:15	2206	10.5	57	2199	11.2	55	2032	9.3	59	2112	8.7	62	2158	9.5	59
6:15-6:30	2302	12.1	53	2311	11.1	55	2337	10.7	59	2298	9.6	62	2311	10.1	60
6:30-6:45	2386	11.9	54	2314	10.2	59	2316	11.4	57	2388	10.1	61	2303	9.9	60
6:45-7:00	2430	12.3	53	2499	12.2	55	2504	12.4	53	2353	10.1	61	2489	10.7	60
7:00-7:15	2497	12.9	52	2609	12.6	55	2443	14.3	43	2384	11.4	57	2540	15.3	44
7:15-7:30	2555	15.5	44	2533	21.0	32	2360	20.2	30	2267	22.1	27	2441	21.0	31
7:30-7:45	2491	19.4	34	2399	21.3	30	2230	23.8	24	2189	23.6	24	2237	24.8	24
7:45-8:00	2225	26.0	23	2288	23.1	26	2305	23.1	26	2055	24.9	22	2303	24.4	25
8:00-8:15	2347	22.8	27	2321	22.7	27	2289	22.0	27	2158	24.3	23	2331	21.9	28
8:15-8:30	2325	21.0	29	2363	21.2	30	2318	23.1	27	2192	24.8	23	2207	23.1	25
8:30-8:45	2391	22.4	28	2398	22.4	29	2242	24.4	24	2275	22.4	27	2264	23.8	25
8:45-9:00	2436	21.1	33	2382	21.9	29	2135	23.1	25	2218	23.0	26	2273	22.5	27
Total Volume	<b>28591</b>			<b>28616</b>			<b>27511</b>			<b>28869</b>			<b>27857</b>		
Aver Occ	17.3			17.6			18.2			17.9			18.1		
Aver Speed		41			40			38			40			39	

**TABLE A5.1.4b**  
**MAINLINE @ SAN GABRIEL, W/B LA-210, PM R28.29**

Time	11/14/00			12/05/00			12/07/00			12/12/00		
	Volume	Occ	Speed	Volume	Occ	Speed	Volume	Occ	Speed	Volume	Occ	Speed
6:00-6:15	2141	8.8	62	2109	9.8	59	2082	8.7	61	1835	8.0	58
6:15-6:30	2161	8.8	63	2247	11.1	57	2253	9.5	61	2013	8.7	59
6:30-6:45	2071	8.5	63	2344	12.2	56	2348	9.1	66	2181	10.2	54
6:45-7:00	2410	10.5	58	2540	12.3	57	2640	10.3	65	2374	10.5	57
7:00-7:15	2426	11.0	56	2480	11.5	59	2499	10.4	63	2460	11.5	55
7:15-7:30	2370	15.4	40	2698	16.6	43	2499	17.2	37	2443	14.7	42
7:30-7:45	2344	20.0	31	2299	22.5	27	2277	22.5	27	2396	20.7	30
7:45-8:00	2041	23.3	22	2252	23.9	25	2320	23.3	26	2411	21.1	30
8:00-8:15	2110	22.5	24	2138	22.2	26	2412	21.8	29	2332	23.6	26
8:15-8:30	2112	22.2	25	2281	23.2	26	2322	23.8	26	2388	22.0	28
8:30-8:45	2061	23.1	23	2290	22.0	27	2376	22.3	28	2350	20.7	30
8:45-9:00	2152	20.9	27	2295	19.9	30	2437	18.4	35	2322	20.2	30
<b>Total Volume</b>	<b>26399</b>						<b>28465</b>			<b>27505</b>		
Aver Occ	16.3				17.3					16.4		16.0
Aver Speed			42			41				44		41

**TABLE A5.1.4c**  
**MAINLINE @ SAN GABRIEL, W/B LA-210, PM R 28.29**

Time	09/25/01			09/26/01			09/27/01			10/02/01			10/03/01			10/04/01		
	Volume	Speed	OCC															
6:00-6:15	1957	7.6	65	2032	7.8	65	1992	7.8	65	1986	7.6	65	1859	7.2	65	1916	7.4	66
6:15-6:30	2205	8.5	66	2113	8.3	65	2099	8.0	66	2057	7.9	65	2094	8.3	64	2051	7.9	66
6:30-6:45	2221	9.8	58	2305	8.9	66	2255	10.1	57	2136	8.3	65	2269	9.5	61	2213	8.6	65
6:45-7:00	2264	14.4	42	2276	12.1	49	2339	11.8	52	2361	9.2	65	2364	9.2	65	2344	10.9	55
7:00-7:15	2173	13.6	42	2135	18.0	32	2193	13.5	43	2356	10.6	57	2340	14.6	42	2314	9.3	64
7:15-7:30	2132	18.7	30	2163	19.0	30	2167	15.5	37	2172	19.2	29	2398	15.4	40	2278	9.3	63
7:30-7:45	2023	20.5	26	2151	19.4	29	2032	20.7	26	2147	20.1	28	2110	20.4	27	2333	12.3	49
7:45-8:00	1864	22.5	21	1974	15.5	32	2048	19.7	27	2080	21.2	25	2072	21.8	25	1946	21.5	23
8:00-8:15	2001	21.7	24	2006	21.2	24	2110	19.0	29	2072	20.8	26	2205	19.6	29	2180	19.1	30
8:15-8:30	2036	20.5	25	2115	19.7	28	1871	22.1	22	2145	19.7	29	2104	21.0	26	2164	20.0	28
8:30-8:45	2046	20.0	27	2044	19.7	27	2105	19.2	29	2175	19.3	29	2175	19.2	29	2193	19.3	30
8:45-9:00	2165	19.7	29	2101	20.4	27	1914	21.2	23	2099	18.9	29	2072	19.7	27	2075	19.7	27
Total Volume	25087			25415			25725			25746			26060			26007		
Aver Occ	16.5			15.8			15.7			15.2			15.5			13.8		
Aver Speed	38			40			40			43			42			47		

TABLE A5.1.4d  
WAVELINE @ SAN GABRIEL, W/B LA-210, PM R 28.29

**TABLE A5.1.5a**  
**MAINLINE @ SIERRA MADRE VILLA, W/B LA-210, PM R 29.19**

Time	10/24/00			10/25/00			10/31/00			11/01/00			11/07/00			
	Volume	OCC	Speed													
6:00-6:15	2045	9.7	52	2051	9.9	51	2048	9.7	52	ND	ND	ND	1981	10.4	49	
6:15-6:30	2093	10.5	49	2136	10.5	51	2322	11.3	51	ND	ND	ND	2161	10.6	51	
6:30-6:45	2163	11.1	49	2076	10.3	50	2170	10.3	53	ND	ND	ND	2167	12.1	46	
6:45-7:00	2261	11.3	50	2224	11.1	50	2364	11.5	51	ND	ND	ND	2756	17.5	46	
7:00-7:15	2253	11.4	49	2326	12.0	49	2733	18.4	43	ND	ND	ND	2276	11.9	48	
7:15-7:30	2347	12.2	48	2331	13.8	42	2294	14.6	41	ND	ND	ND	2267	14.8	38	
7:30-7:45	2319	12.9	45	2211	17.8	32	2062	24.6	22	ND	ND	ND	2105	20.6	26	
7:45-8:00	2015	22.3	24	2140	20.3	28	2125	22.4	24	ND	ND	ND	2029	23.6	23	
8:00-8:15	2031	20.5	26	1983	21.6	25	2062	21.2	25	ND	ND	ND	2119	17.6	31	
8:15-8:30	2118	15.2	36	2194	18.3	31	2140	15.9	34	1983	24.1	21	2004	18.4	28	
8:30-8:45	2194	11.6	48	2169	13.5	41	ND	ND	ND	2060	21.1	25	2009	19.1	27	
8:45-9:00	ND	ND	ND	2028	17.8	29										
<i>Total Volume</i>	<i>28006</i>			<i>26008</i>			<i>26784</i>			<i>24258</i>			<i>25902</i>			
Aver Occ		13.5			14.5			16.0			22.6			16.2		
Aver Speed		44			41			40			23			37		

**TABLE A5.1.5b**  
**MAINLINE @ SIERRA MADRE VILLA, W/B LA-210, PM R 29.19**

Time	11/14/00			12/05/00			12/07/00			12/12/00		
	Volume	OCC	Speed									
6:00-6:15	2087	10.1	51	1934	8.3	58	2145	8.8	58	1926	8.6	53
6:15-6:30	2053	9.4	54	1973	11.8	54	2303	9.5	58	2089	9.2	54
6:30-6:45	2025	9.6	53	2173	12.3	52	2373	9.7	58	2184	9.5	55
6:45-7:00	2201	10.6	52	2191	14.9	52	2590	10.6	58	2340	10.0	56
7:00-7:15	2204	10.7	51	1930	22.8	58	2415	10.4	55	2373	10.2	55
7:15-7:30	2446	12.7	48	2337	11.4	51	2460	12.0	49	2466	11.1	53
7:30-7:45	2257	14.8	39	2172	13.4	41	2160	16.5	31	2360	13.9	41
7:45-8:00	2075	20.5	26	2048	21.8	25	2204	17.9	30	2279	13.9	39
8:00-8:15	2041	23.2	23	1833	23.2	21	2055	17.5	28	2100	17.1	30
8:15-8:30	2096	23.1	23	2065	17.6	31	2041	17.7	28	2144	14.1	36
8:30-8:45	2052	21.9	24	1771	25.4	20	2186	15.1	35	2170	13.9	37
8:45-9:00	1976	20.7	25	2117	13.3	40	2274	12.3	44	2318	11.4	48
<b>Total Volume</b>	<b>25513</b>			<b>24544</b>			<b>27206</b>			<b>26749</b>		
<b>Aver OCC</b>	<b>15.6</b>			<b>16.4</b>			<b>13.2</b>			<b>11.9</b>		
<b>Aver Speed</b>		<b>39</b>			<b>42</b>			<b>45</b>			<b>47</b>	

**TABLE A5.1.5c**  
**MAINLINE @ SIERRA MADRE VILLA, W/B LA-210, PM R 29.19**

Time	09/25/01			09/26/01			09/27/01			MOD TOD			10/03/01			10/04/01		
	Volume	Speed	Occ	Volume	Speed	Occ	Volume	Speed	Occ	Volume	Speed	Occ	Volume	Speed	Occ	Volume	Speed	Occ
6:00-6:15	1966	8.6	57	2006	8.6	58	ND	NA	NA	1969	8.2	59	ND	NA	NA	1917	8.1	59
6:15-6:30	2125	9.0	58	2086	9.2	57	ND	NA	NA	2001	8.8	57	ND	NA	NA	1993	8.5	58
6:30-6:45	2198	9.2	60	2258	9.9	57	ND	NA	NA	2108	9.3	57	ND	NA	NA	2175	9.4	58
6:45-7:00	2241	10.4	53	2234	10.1	55	ND	NA	NA	2236	9.6	58	ND	NA	NA	2260	9.7	58
7:00-7:15	2109	10.7	49	2192	10.9	50	ND	NA	NA	2279	10.2	56	ND	NA	NA	2150	9.5	57
7:15-7:30	2203	14.4	39	2085	15.7	34	ND	NA	NA	2236	13.0	43	ND	NA	NA	2206	9.5	58
7:30-7:45	2038	16.6	33	2109	15.9	34	ND	NA	NA	2146	15.2	36	ND	NA	NA	2263	10.2	56
7:45-8:00	1833	23.1	21	1947	21.0	24	ND	NA	NA	2125	17.2	32	ND	NA	NA	2077	16.4	33
8:00-8:15	2027	16.5	17	2011	18.8	28	ND	NA	NA	2005	19.1	27	ND	NA	NA	2096	18.1	30
8:15-8:30	1972	21.2	21	2032	19.3	27	ND	NA	NA	2062	16.6	32	ND	NA	NA	2065	16.9	31
8:30-8:45	2005	16.6	31	2076	18.4	29	2130	15.0	38	2159	13.0	42	ND	NA	NA	2227	12.1	47
8:45-9:00	1982	16.6	31	ND	NA	ND	NA	NA	NA	1963	15.9	32	2027	15.1	34	2056	14.2	37
Total Volume	<b>24699</b>		<b>23036</b>		<b>ND</b>		<b>25289</b>		<b>ND</b>		<b>ND</b>		<b>ND</b>		<b>ND</b>	<b>25689</b>		
Aver Occ	14.4		14.3		ND		13.0		ND		ND		ND		ND	11.9		
Aver Speed	40		42		NA		44		NA		NA		NA		NA	49		

TABLE A5.1.5d

**MAINLINE @ SIERRA MADRE VILLA, W/B LA-210, PM R 29.19**

Time	SWARM 1			SWARM 2b			SWARM 1/2b		
	10/16/01	10/23/01	10/17/01	10/24/01	10/18/01	10/24/01	Volume	Speed	Speed
	Volume CC	Speed CC	Volume CC	Speed CC	Volume CC	Speed CC	Volume CC	Speed CC	Speed CC
6:00-6:15	ND	ND	ND	ND	ND	ND	1963	8.3	59
6:15-6:30	ND	ND	ND	ND	ND	ND	ND	ND	ND
6:30-6:45	2209	11.8	53	ND	ND	ND	2022	8.5	59
6:45-7:00	2489	14.9	52	ND	ND	ND	2077	9.0	57
							2268	9.6	59
7:00-7:15	2423	10.3	56	ND	ND	ND	2283	10.0	57
7:15-7:30	2305	11.8	49	ND	ND	ND	2307	11.2	52
7:30-7:45	2155	15.5	36	ND	ND	ND	2082	15.8	34
7:45-8:00	2196	16.0	35	ND	ND	ND	2039	18.4	29
8:00-8:15	2147	16.9	32	ND	ND	ND	2058	16.9	32
8:15-8:30	2179	13.4	41	ND	ND	ND	2076	13.6	39
8:30-8:45	2148	15.4	36	2031	12.9	40	ND	12.0	44
8:45-9:00	1778	19.3	24	2273	11.5	51	ND	2094	9.8
<b>Total Volume</b>	<b>22029</b>		<b>ND</b>		<b>ND</b>		<b>25420</b>		<b>ND</b>
Aver Occ	14.5		ND		ND		11.9		ND
Aver Speed		<b>42</b>		<b>ND</b>		<b>ND</b>	<b>48</b>		<b>ND</b>

**TABLE A5.1.6a**  
**MAINLINE @ ROSEMEAD 1, W/B LA-210, PM R 29.59**

Time	10/24/00			10/25/00			10/31/00			11/01/00			11/07/00		
	Volume	Occ	Speed												
6:00-6:15	2276	10.8	53	2254	10.8	52	2211	10.4	53	2265	10.5	53	2244	10.9	51
6:15-6:30	2273	10.9	52	2259	11.8	48	2360	13.6	44	2436	12.1	51	2315	12.1	48
6:30-6:45	2269	11.8	48	2270	11.8	48	2334	11.5	51	2431	12.0	51	2329	12.0	49
6:45-7:00	2385	12.6	48	2480	12.9	49	2383	12.0	50	2345	12.1	49	2463	12.3	51
7:00-7:15	2378	12.9	47	2455	13.8	45	2435	12.7	49	2363	13.1	46	2396	12.8	48
7:15-7:30	2431	13.4	46	2441	14.8	42	2444	13.8	45	2353	15.7	38	2406	14.1	44
7:30-7:45	2451	13.4	47	2303	15.9	37	2180	18.8	31	2120	18.7	30	2146	18.6	30
7:45-8:00	2120	19.7	29	2301	15.3	39	2125	18.7	30	2014	19.9	28	2083	20.0	28
8:00-8:15	2091	17.2	32	2086	17.5	32	2218	16.6	35	2044	20.3	28	2165	16.6	34
8:15-8:30	2150	16.2	34	2159	16.1	35	2178	16.8	34	1966	19.3	27	2065	18.4	30
8:30-8:45	2268	13.5	43	2178	15.8	36	2041	17.0	31	2105	15.9	34	2044	16.5	33
8:45-9:00	2133	14.6	38	2168	15.4	36	2036	18.0	30	2013	16.0	33	2089	15.2	36
<b>Total Volume</b>	<b>27225</b>			<b>27374</b>			<b>26944</b>			<b>26455</b>			<b>26755</b>		
Aver Speed	13.9			14.3			15.0			15.5			15.0		
	43			42			41			40			41		

**TABLE A5.1.6b**  
**MAINLINE @ ROSEMEAD 1, W/B LA-210, PM R 29.59**

Time	11/14/00			12/05/00			12/07/00			12/12/00		
	Volume	Speed	Occ									
6:00-6:15	2309	11.3	51	2160	9.0	60	2156	9.1	60	1924	9.6	50
6:15-6:30	2179	10.3	53	2209	9.8	57	2224	9.3	60	2036	10.2	50
6:30-6:45	2151	10.5	52	2308	10.4	56	2374	10.5	57	2165	10.8	51
6:45-7:00	2375	11.6	52	2443	11.3	55	2480	11.7	54	2345	11.3	53
7:00-7:15	2316	11.6	51	2355	10.5	57	2345	11.4	52	2320	11.5	51
7:15-7:30	2506	15.0	43	2374	14.7	42	2438	13.4	47	2473	13.3	47
7:30-7:45	2333	17.9	34	2248	14.1	41	2224	15.9	37	2378	14.2	43
7:45-8:00	2300	19.2	31	2080	18.3	31	2278	15.5	38	2371	13.3	46
8:00-8:15	1980	19.7	27	1958	17.0	31	2096	16.9	33	2265	15.3	39
8:15-8:30	2150	16.0	35	2056	15.9	34	2200	14.5	39	2186	13.9	41
8:30-8:45	2099	16.0	34	2056	15.2	34	2268	12.9	45	2191	12.6	44
8:45-9:00	2034	16.0	33	2096	14.7	37	2260	13.2	44	2281	11.3	52
<b>Total Volume</b>	<b>26732</b>			<b>26343</b>			<b>27343</b>			<b>26935</b>		
Aver Occ	14.6			13.4			12.9			12.3		
Aver Speed		42			45			47			47	

**TABLE A5.1.6c**  
**MAINLINE @ ROSEMEAD 1, W/B LA-210, PM R 29.59**

MOD TOD																		
	09/25/01			09/26/01			09/27/01			10/02/01			10/03/01			10/04/01		
Time	Volume OCC	Speed OCC																
6:00-6:15	2011	9.3	54	2063	9.4	55	2011	9.1	55	2016	8.9	56	1933	8.5	56	1977	8.6	57
6:15-6:30	2159	9.7	58	2108	10.1	52	2089	9.7	54	2041	10.5	48	2112	9.8	53	2056	9.2	55
6:30-6:45	2250	9.8	60	2288	10.8	53	2272	10.5	54	2134	10.1	52	2256	10.6	53	2208	10.2	54
6:45-7:00	2265	10.3	53	2253	11.4	49	2281	11.5	50	2262	10.6	53	2356	11.1	53	2303	10.8	53
7:00-7:15	2140	12.6	49	2245	10.8	51	2164	11.0	49	2308	11.2	52	2281	11.8	48	2147	10.6	50
7:15-7:30	2220	12.2	39	2111	15.5	35	2170	13.0	42	2279	14.0	41	2394	13.9	43	2220	10.4	53
7:30-7:45	2113	13.4	33	2112	15.4	35	2130	14.0	39	2184	14.5	38	2233	14.8	38	2292	11.1	52
7:45-8:00	1862	19.7	21	1942	18.4	29	1983	15.1	34	2148	15.5	36	2106	16.2	34	2146	15.4	36
8:00-8:15	2030	15.5	32	2057	17.2	34	2102	12.8	42	2006	16.1	32	2078	15.5	34	2005	17.2	30
8:15-8:30	1958	14.9	24	1994	15.7	33	2065	13.8	38	2090	15.3	36	2085	15.2	35	ND	ND	ND
8:30-8:45	2033	15.6	31	2114	14.1	38	1963	15.9	32	2172	13.0	42	2182	12.8	43	ND	ND	ND
8:45-9:00	2080	15.0	31	1984	13.8	37	1945	15.6	32	1901	9.3	49	2022	13.0	39	2087	13.6	38
<b>Total Volume</b>	<b>25121</b>				<b>25271</b>		<b>25175</b>			<b>25541</b>			<b>26038</b>		<b>21441</b>			
Aver Occ	13.2				13.6			12.7			12.4			12.8		11.7		
Aver Speed		41			42			44			45			44		48		

**MAINLINE @ ROSEMEAD 1, W/B LA-210, PM R 29.59**  
**TABLE A5.1.6d**

Time	SWARM 1				SWARM 2b				SWARM 1/2b			
	10/16/01	10/23/01	10/17/01	10/24/01	10/18/01	10/25/01	10/19/01	10/26/01	Volume	Speed	Volume	Speed
	CC	Speed	Volume	Speed	CC	Speed	Volume	CC	Speed	CC	Speed	
6:00-6:15	1946	8.6	56	1980	8.4	58	1913	8.3	57	2003	9.0	55
6:15-6:30	2110	9.3	56	2101	9.3	56	2021	10.1	49	2061	8.9	57
6:30-6:45	2217	10.3	53	2216	10.5	53	2257	10.6	53	2133	10.6	50
6:45-7:00	2310	11.3	51	2260	10.5	54	2277	11.7	49	2304	10.3	56
7:00-7:15	2328	11.4	51	2221	10.8	51	2269	11.0	51	2309	10.7	54
7:15-7:30	2332	12.7	46	2317	12.3	47	2229	11.6	48	2311	12.2	48
7:30-7:45	2248	13.3	43	2152	14.2	38	2183	12.9	42	2147	14.3	38
7:45-8:00	2194	14.1	40	2178	14.1	39	2016	14.7	35	2075	14.6	37
8:00-8:15	2133	15.0	36	2155	13.6	40	2004	14.1	36	2089	13.0	41
8:15-8:30	2167	14.1	39	2095	14.2	38	1979	14.5	35	2093	12.6	42
8:30-8:45	2159	13.3	41	2074	13.2	40	1935	14.1	35	2108	12.4	43
8:45-9:00	1909	13.6	36	2118	11.2	48	2088	10.8	48	2105	10.8	49
<b>Total Volume</b>	<b>26053</b>		<b>25867</b>		<b>25171</b>		<b>25738</b>		<b>25247</b>		<b>26939</b>	
Aver Occ	12.3		11.9		12.0		11.6		11.9		11.6	
Aver Speed		46		47		45		48		46		49

## MAINLINE @ ROSEMEAD 2 W/B LA-210, PM R 29.71

**TABLE A5.1.7b**  
**MAINLINE @ ROSEMEAD 2, W/B LA-210, PM R 29.71**

		OR TOD			
		11/14/00	12/05/00	12/07/00	12/12/00
Time	Volume	Speed OCC	Speed OCC	Volume OCC	Speed OCC
6:00-6:15	ND	ND	ND	ND	ND
6:15-6:30	ND	ND	ND	ND	ND
6:30-6:45	ND	ND	ND	ND	ND
6:45-7:00	ND	ND	ND	ND	ND
7:00-7:15	ND	ND	ND	ND	ND
7:15-7:30	ND	ND	ND	ND	ND
7:30-7:45	ND	ND	ND	ND	ND
7:45-8:00	ND	ND	ND	ND	ND
8:00-8:15	ND	ND	ND	ND	ND
8:15-8:30	ND	ND	ND	ND	ND
8:30-8:45	ND	ND	ND	ND	ND
8:45-9:00	ND	ND	ND	ND	ND
<b>Total Volume</b>	<b>ND</b>	<b>ND</b>	<b>ND</b>	<b>ND</b>	<b>ND</b>
Aver Occ	ND	ND	ND	ND	ND
Aver Speed	ND	ND	ND	ND	ND
				<b>21369.6</b>	<b>4.5</b>

**TABLE A5.1.7c**  
**MAINLINE @ ROSEMEAD 2, W/B LA-210, PM R 29.71**

MOD TOD							
		09/25/01		09/26/01		09/27/01	
Time	Volume OCC	Speed OCC	Volume OCC	Speed OCC	Volume OCC	Speed OCC	Volume OCC
6:00-6:15	1596	10.2	58	1586	9.7	60	1514
6:15-6:30	1700	10.3	60	1612	10.6	56	1258
6:30-6:45	1776	10.5	62	1890	12.0	58	1840
6:45-7:00	1856	12.0	57	1856	12.6	55	1936
7:00-7:15	1790	14.6	45	1878	12.6	55	1792
7:15-7:30	1978	14.3	51	1826	18.8	36	1900
7:30-7:45	1836	16.0	43	1906	16.8	42	1916
7:45-8:00	1698	21.9	29	1782	20.3	33	1792
8:00-8:15	1812	19.7	34	1822	18.1	37	1872
8:15-8:30	1770	21.4	31	1754	20.1	32	1788
8:30-8:45	1808	21.1	32	1782	18.0	37	1714
8:45-9:00	1780	19.3	34	1776	18.3	36	1714
<b>Total Volume</b>	<b>21400</b>			<b>21470</b>		<b>21036</b>	
Aver Occ	<b>15.9</b>			<b>15.7</b>		<b>15.2</b>	
Aver Speed	<b>45</b>			<b>45</b>		<b>46</b>	
						<b>47</b>	
						<b>48</b>	
						<b>49</b>	
						<b>50</b>	
						<b>51</b>	

MAINLINE @ ROSEMEAD 2, W/B LA-210, PM R 29.71

**MAINLINE @ MICHILLINDA W/B LA-210, PM R 29.85**

OR TOD						
10/24/00			10/01/00			11/01/00
Time	Volume	Speed	Volume	Speed	Volume	Speed
6:00-6:15	1701	9.0	79	1705	9.1	78
6:15-6:30	1831	9.9	77	1809	10.4	76
6:30-6:45	1807	11.1	73	1811	11.0	73
6:45-7:00	1859	11.4	74	1820	10.9	74
7:00-7:15	1797	11.3	72	1872	11.5	73
7:15-7:30	1664	15.3	40	1672	15.3	40
7:30-7:45	1608	14.4	41	1578	18.3	32
7:45-8:00	1490	21.6	25	1616	18.5	32
8:00-8:15	1512	23.2	24	1422	19.5	27
8:15-8:30	1456	22.1	24	1510	20.0	28
8:30-8:45	1578	16.6	35	1506	17.7	31
8:45-9:00	1430	16.2	33	1532	15.6	36
Total Volume	19733			19853		19818
Aver Occ	15.2			14.8		16.3
Aver Speed				52		52
Speed						48
CC						48
VOLUME						50
11/07/00						51

**TABLE A5.1.8b**  
**MAINLINE @ MICHILLINDA, W/B LA-210, PM R 29.85**

Time	OR TOD				Speed OCC	Volume OCC	Speed OCC	Volume OCC	Speed OCC
	11/14/00	12/05/00	12/07/00	12/12/00					
6:00-6:15	1781	9.8	78	1665	8.1	84	ND	ND	1800
6:15-6:30	1755	9.6	77	1785	10.0	77	ND	ND	1560
6:30-6:45	1747	10.0	74	1829	10.0	79	ND	ND	ND
6:45-7:00	1660	13.7	45	1915	10.8	78	ND	ND	ND
7:00-7:15	1650	13.7	44	1660	11.9	51	ND	ND	2120
7:15-7:30	1756	14.8	44	1668	17.7	35	ND	ND	ND
7:30-7:45	1602	17.7	33	1542	17.1	34	ND	ND	ND
7:45-8:00	1622	19.9	30	1478	20.5	27	ND	ND	ND
8:00-8:15	1346	22.5	22	1404	24.4	21	ND	ND	1900
8:15-8:30	1474	22.1	25	1390	20.4	25	ND	ND	ND
8:30-8:45	1464	18.7	29	1412	22.8	23	ND	ND	1300
8:45-9:00	1424	17.0	31	1462	19.1	28	ND	ND	2080
Total Volume	<b>19281</b>			<b>19220</b>		<b>ND</b>			<b>21520</b>
Aver Occ	<b>15.8</b>			<b>16.1</b>		<b>ND</b>			<b>11.9</b>
Aver Speed		<b>46</b>		<b>49</b>		<b>ND</b>			<b>84</b>

**TABLE A5.1.8c**  
**MAINLINE @ MICHILLINDA, W/B LA-210, PM R 29.85**

MOD TOD											
09/25/01			09/26/01			09/27/01			10/02/01	10/03/01	10/04/01
Time	Volume CC	Speed CC	Volume CC	Speed CC	Volume CC	Speed CC	Volume CC	Speed CC	Volume CC	Speed CC	Volume CC
6:00-6:15	2043	12.9	50	2032	11.7	56	1976	11.6	54	2000	11.5
6:15-6:30	2059	12.2	54	2053	12.8	51	2045	12.1	54	1940	13.0
6:30-6:45	2040	12.0	55	2103	12.7	53	2060	12.3	53	1937	13.1
6:45-7:00	1979	12.5	51	1996	13.7	47	2080	13.5	49	2004	12.9
7:00-7:15	1833	14.1	42	1908	13.1	47	1841	12.6	47	1941	13.2
7:15-7:30	1867	13.7	44	1701	17.5	31	1847	13.7	43	1917	15.9
7:30-7:45	1708	16.5	33	1743	15.7	36	1761	16.0	36	1787	15.0
7:45-8:00	1485	21.8	22	1531	21.5	23	1515	19.6	25	1697	18.4
8:00-8:15	1599	19.6	26	1749	15.9	35	1812	13.4	44	1655	17.0
8:15-8:30	1623	19.9	26	1615	20.9	25	1728	16.5	34	1784	17.1
8:30-8:45	1699	17.7	31	1760	15.9	36	1653	18.9	28	1795	15.4
8:45-9:00	1731	15.3	36	1701	17.0	32	1671	16.4	33	1512	9.6
Total Volume	<b>21666</b>			<b>21892</b>			<b>21989</b>			<b>22674</b>	
Aver Occ	<b>15.7</b>			<b>15.7</b>			<b>14.7</b>			<b>14.3</b>	
Aver Speed		<b>40</b>			<b>40</b>		<b>43</b>			<b>42</b>	
										<b>43</b>	
										<b>47</b>	

**TABLE 5.1.8d**  
**MAINLINE @ MICHILLINDA, W/B LA-210, PM R 29.85**

**MAINLINE @ BALDWIN1, W/B LA-210, PM R 30.49**

OR TOD								
	10/24/00	10/25/00	10/31/00	11/01/00	11/07/00			
Time	Volume CC	Speed CC	Volume CC	Speed CC	Volume CC	Speed CC	Volume CC	
6:00-6:15	2303	13.4	52	2141	12.5	52	2336	14.5
6:15-6:30	2191	13.8	48	2072	16.5	38	2523	15.8
6:30-6:45	2045	15.4	40	2023	17.9	34	2259	21.7
6:45-7:00	1885	19.1	30	2153	20.2	33	2288	24.0
7:00-7:15	1905	26.3	29	1980	18.0	33	2356	21.7
7:15-7:30	1917	21.3	28	1871	17.1	34	2121	26.3
7:30-7:45	1888	23.5	25	2071	22.8	28	1957	27.0
7:45-8:00	1368	35.8	21	1703	22.2	24	1858	29.1
8:00-8:15	1641	22.9	22	1521	25.2	19	1942	26.4
8:15-8:30	1637	23.3	22	1688	23.3	22	1815	27.6
8:30-8:45	1787	20.8	26	1771	19.4	28	1881	25.4
8:45-9:00	1594	29.7	25	1897	16.0	37	1955	24.4
Total Volume	22161		22891		25291		24095	23409
Aver Occ	22.1		19.3		23.7		24.3	21.9
Aver Speed		32		32	31		32	33

**TABLE A5.1.9b**  
**MAINLINE @ BALDWIN1, W/B LA-210, PM R 30.49**

Time	OR TOD			
	11/14/00	12/05/00	12/07/00	12/12/00
Volume	Speed	Volume	Speed	Volume
Time	Occ	Occ	Occ	Occ
6:00-6:15	2243	15.3	47	2035
6:15-6:30	2072	17.2	39	2088
6:30-6:45	1944	22.0	29	1991
6:45-7:00	2081	22.0	31	2001
7:00-7:15	1956	21.7	30	1895
7:15-7:30	2007	21.7	31	1859
7:30-7:45	2010	21.0	32	1751
7:45-8:00	1882	22.6	28	1553
8:00-8:15	1676	25.8	22	1524
8:15-8:30	1740	25.0	24	1616
8:30-8:45	1902	23.3	28	1593
8:45-9:00	1654	26.6	21	1683
<b>Total Volume</b>	<b>23167</b>		<b>21589</b>	
Aver Occ		<b>22.0</b>		<b>19.0</b>
Aver Speed			<b>31</b>	
			<b>35</b>	
				<b>36</b>
				<b>26</b>

**MAINLINE @ BALDWIN 1, W/B LA-2110, PM R 30.49**

MOD TOD						
9/25/01		9/26/01		9/27/01		10/02/01
Time	Volume	Speed	Occ	Volume	Speed	Occ
6:00-6:15	1500	3.8	ND	1540	3.9	ND
6:15-6:30	1746	4.4	ND	1696	4.3	ND
6:30-6:45	1700	4.3	ND	1886	4.8	ND
6:45-7:00	1754	4.4	ND	1754	4.5	ND
7:00-7:15	1530	4.0	ND	1960	5.1	ND
7:15-7:30	ND	ND	ND	ND	ND	ND
7:30-7:45	ND	ND	ND	ND	ND	ND
7:45-8:00	ND	ND	ND	ND	ND	ND
8:00-8:15	ND	ND	ND	ND	ND	ND
8:15-8:30	ND	ND	ND	ND	ND	ND
8:30-8:45	ND	ND	ND	ND	ND	ND
8:45-9:00	ND	ND	ND	ND	ND	ND
Total Volume	ND	ND	ND	ND	ND	ND
Aver Occ	ND	ND	ND	ND	ND	ND
Aver Speed	ND	ND	ND	ND	ND	ND

**MAINLINE @ BALDWIN 1, W/B LA-210, PW R 30.49**



**TABLE A5.1.10b**  
**MAINLINE @ BALDWIN 2, W/B LA-210, PM R 30.71**

Time	11/14/00			12/05/00			12/07/00			12/12/00		
	Volume	CC	Speed									
6:00-6:15	1960	11.9	52	1895	9.6	63	1878	9.6	63	1656	9.8	55
6:15-6:30	1847	12.9	46	1905	11.2	55	1937	10.8	57	1716	13.0	42
6:30-6:45	1662	17.6	31	1794	13.9	42	1857	11.8	51	1737	12.7	44
6:45-7:00	1649	17.8	30	1772	12.1	47	1964	12.2	52	1679	15.6	35
7:00-7:15	1624	18.3	29	1721	9.7	57	1656	14.1	38	1670	15.1	36
7:15-7:30	1633	17.0	31	1629	14.2	37	1634	15.3	35	1621	14.1	37
7:30-7:45	1589	15.7	33	1513	16.4	30	1634	14.0	38	1608	15.7	33
7:45-8:00	1525	16.4	30	1324	19.8	22	1410	19.5	24	1535	15.6	32
8:00-8:15	1395	21.6	20	1289	21.8	20	1321	22.4	20	1568	15.8	32
8:15-8:30	1336	21.4	20	1331	19.5	22	1474	18.6	26	1522	18.9	26
8:30-8:45	1464	21.2	22	1370	20.5	22	1510	16.1	30	1600	15.8	33
8:45-9:00	1350	23.0	20	1411	19.3	24	1585	17.0	30	1572	16.1	32
<i>Total Volume</i>	<b>18994</b>			<b>18954</b>			<b>19860</b>			<b>19484</b>		
Aver Occ	17.9			15.7			15.1			14.9		
Aver Speed		31		39			40			37		

**TABLE A5.1.10c**  
**MAINLINE @ BALDWIN 2, W/B LA-210, PM R 30.71**

MOD TOD							
	9/25/01	9/26/01	9/27/01	10/02/01	10/03/01	10/04/01	
Time	Volume OCC	Speed OCC	Volume OCC	Speed OCC	Volume OCC	Speed OCC	Volume OCC
6:00-6:15	1676	10.5	54	1684	10.1	56	1656
6:15-6:30	1767	12.1	49	1763	12.2	49	1735
6:30-6:45	1756	10.6	56	1800	14.2	43	1804
6:45-7:00	1684	12.8	45	1692	12.7	45	1773
7:00-7:15	1592	15.8	34	1600	16.6	33	1588
7:15-7:30	1303	25.1	21	1381	23.1	21	1532
7:30-7:45	1295	24.8	18	1376	22.7	21	1448
7:45-8:00	1209	24.3	17	1239	30.2	15	1121
8:00-8:15	1164	26.2	15	1304	24.0	18	1345
8:15-8:30	1269	23.7	19	1259	27.5	16	1376
8:30-8:45	1304	25.6	18	1349	21.5	21	1309
8:45-9:00	1313	24.2	19	1395	20.1	24	1412
Total Volume	17332			17842		18099	
Aver Occ	19.6			19.6		17.4	
Aver Speed	33			32		35	

TABLE A5.1.10d

MAINLINE @ BALDWIN 2, W/B LA-210, PM R 30.71

**TABLE A5.1.11a**  
**MAINLINE @ SANTA ANITA 1, W/B LA-210, PM R 31.73**

Time	10/24/00			10/25/00			10/31/00			11/01/00			11/07/00		
	Volume Q	Speed S	Volume Q												
6:00-6:15	1880	11.3	54	1869	15.4	48	1954	12.9	49	1949	14.8	42	1941	14.9	42
6:15-6:30	1952	13.1	48	1972	16.7	38	1890	20.0	34	1935	14.9	42	1852	19.2	34
6:30-6:45	1746	25.1	26	1740	27.1	23	1859	23.4	26	1820	21.4	32	1694	24.0	25
6:45-7:00	1643	27.6	25	1640	26.9	22	1651	26.3	22	1651	23.7	27	1875	22.5	28
7:00-7:15	1720	24.8	23	1772	23.4	25	1630	27.4	22	1632	26.0	22	1755	22.6	27
7:15-7:30	1678	24.4	22	1710	22.8	25	1456	23.1	24	1558	27.7	19	1397	34.8	23
7:30-7:45	1591	27.8	20	1616	27.3	21	1572	23.0	23	1438	29.8	17	1526	28.2	18
7:45-8:00	1402	29.7	17	1335	32.3	18	1297	34.1	14	1289	31.7	14	1374	30.5	15
8:00-8:15	1270	33.3	14	1109	38.5	12	1473	26.7	18	1291	32.1	13	1289	32.5	14
8:15-8:30	1500	27.3	18	1378	30.2	17	1433	28.2	17	1344	31.2	15	1500	26.4	19
8:30-8:45	1544	26.7	19	1424	32.2	19	1433	29.1	19	1324	30.3	14	1296	30.5	15
8:45-9:00	1458	26.4	19	1507	24.4	21	1446	25.9	18	1373	28.8	16	1338	29.8	16
Total Volume	19386			19072			19094			18604			18837		
Aver Occ	24.8			26.4			25.0			26.0			26.3		
Aver Speed		27			25			25			24			24	

**TABLE A5.1.11b**  
**MAINLINE @ SANTA ANITA 1, W/B LA-210, PM R 31.73**

Time	11/14/00			12/05/00			12/07/00			12/12/00		
	Volume	Speed	Volume	Speed	Volume	Speed	Volume	Speed	Volume	Speed	Volume	Speed
6:00-6:15	1958	11.9	53	1900	10.1	61	1883	10.1	60	1630	10.2	52
6:15-6:30	1807	16.9	38	1968	11.6	56	1942	13.2	48	1757	12.6	46
6:30-6:45	1470	31.8	21	1726	22.7	26	1843	18.9	32	1619	24.3	26
6:45-7:00	1631	27.0	20	1691	24.5	24	1776	23.7	29	1703	23.8	25
7:00-7:15	1612	23.8	22	1663	20.3	27	1657	22.3	25	1605	23.3	24
7:15-7:30	1581	28.0	21	1747	19.8	29	1695	23.9	24	1670	23.2	24
7:30-7:45	1588	26.7	20	1359	30.9	18	1681	24.2	23	1591	25.4	23
7:45-8:00	1454	29.4	17	1395	27.3	17	1651	25.5	19	1432	28.9	21
8:00-8:15	1396	28.9	16	1415	24.4	19	1481	26.1	19	1611	22.7	23
8:15-8:30	1428	29.4	17	1126	31.1	13	1448	26.0	19	1538	25.1	22
8:30-8:45	1336	31.5	15	1499	22.4	22	1425	26.4	18	1610	21.9	24
8:45-9:00	1341	30.4	17	1304	27.2	17	1768	19.3	31	1522	24.0	22
<b>Total Volume</b>	<b>18602</b>			<b>18793</b>			<b>20010</b>			<b>19228</b>		
Aver Occ	26.3			22.7			21.6			22.1		
Aver Speed		24			29			30			28	

**TABLE A5.1.11c**  
**MAINLINE @ SANTA ANITA 1, W/B LA-210, PM R 31.73**

MOD TOD																			
Time	9/25/01			9/26/01			9/27/01			10/02/01			10/03/01			10/04/01			
	Volume	Speed	Occ																
6:00-6:15	1851	10.0	60	1854	12.0	55	1825	10.0	59	1810	9.5	61	1707	10.9	56	1793	9.5	61	
6:15-6:30	1905	10.3	60	1937	11.1	57	1810	14.1	51	1867	10.6	57	1944	11.2	56	1885	10.4	59	
6:30-6:45	1873	10.4	59	1883	13.7	44	1903	10.7	58	1787	16.4	36	1890	11.1	56	1860	10.9	56	
6:45-7:00	1838	12.7	48	1648	23.4	27	1866	12.3	50	1774	17.7	33	1905	14.3	44	1938	12.0	53	
7:00-7:15	1475	26.7	24	1607	23.0	25	1586	21.8	30	1689	21.6	26	1748	17.5	34	1383	8.3	55	
7:15-7:30	1379	27.4	19	1512	23.4	21	1589	22.9	23	1669	21.5	27	1632	19.4	30	1480	12.5	51	
7:30-7:45	1480	26.0	19	1347	29.1	17	1561	21.9	22	1541	24.0	21	1652	22.4	24	1698	10.4	54	
7:45-8:00	1423	26.4	18	1347	29.8	17	1321	28.5	15	1479	24.5	20	1441	26.5	18	1792	14.4	41	
8:00-8:15	1113	33.7	12	1271	28.5	16	1388	27.5	20	1434	24.5	19	1377	25.8	18	1237	29.4	15	
8:15-8:30	1389	27.4	17	1411	25.9	18	1406	26.9	24	1264	30.5	18	1543	23.1	25	1626	22.2	24	
8:30-8:45	1400	26.8	19	1444	24.9	19	1340	26.6	19	1568	17.4	28	1475	23.1	21	1500	24.9	24	
8:45-9:00	1414	24.2	19	1369	27.1	21	1471	24.6	24	1070	8.6	50	1596	20.3	27	1352	26.4	23	
<i>Total Volume</i>	<i>18810</i>			<i>18830</i>			<i>19066</i>			<i>18952</i>			<i>19910</i>			<i>19544</i>			
Aver Occ	21.8			22.7			20.7			18.9			18.8			15.9			
Aver Speed		34			30			35			34			35			44		

**MAINLINE @ SANTA ANITA 1, W/B LA-210, PM R 31.73**

SWARM 1		SWARM 2b						SWARM 1/2b								
10/16/01		10/23/01			10/17/01			10/24/01			10/18/01			11/07/01		
Time	Volume	Speed	Occ	Volume	Speed	Occ	Volume	Speed	Occ	Volume	Speed	Occ	Volume	Speed	Occ	
6:00-6:15	1781	9.5	61	1817	9.5	62	1773	9.5	60	1909	10.4	59	1829	9.7	61	
6:15-6:30	1876	10.6	58	1911	10.8	58	1800	14.0	42	1790	9.9	59	1919	11.2	56	
6:30-6:45	1864	11.2	55	1795	15.5	46	1860	11.3	54	1807	10.5	56	1776	15.6	40	
6:45-7:00	1780	17.5	38	1766	20.7	31	1912	11.4	55	1740	10.0	57	1682	20.4	29	
7:00-7:15	1781	18.3	32	1616	23.4	25	1660	18.6	29	1878	11.5	54	1643	22.1	28	
7:15-7:30	1567	23.2	27	1506	26.0	21	1662	21.9	25	1667	18.7	29	1379	28.4	22	
7:30-7:45	1475	27.5	20	1470	26.4	21	1456	26.3	20	1532	21.3	24	1603	22.6	23	
7:45-8:00	1400	27.3	18	1327	27.5	17	1458	25.4	20	1464	11.9	40	1474	25.7	21	
8:00-8:15	1453	25.8	19	1612	21.9	25	1224	27.9	18	1356	11.6	42	1221	31.0	16	
8:15-8:30	1476	23.8	21	1370	27.7	18	1384	26.3	17	1582	18.9	28	1379	25.8	18	
8:30-8:45	1681	19.1	29	1436	25.0	20	1336	26.7	18	1344	28.1	18	1388	15.5	31	
8:45-9:00	1462	22.8	21	1489	24.2	23	1364	25.0	18	1462	26.0	22	1407	25.4	22	
Total Volume	19596			19115			129869			19531			18700			
Aver Occ	19.7			21.6			20.4			15.7			21.1			
Aver Speed	35			32			33			42			32			

**MAINLINE @ SANTA ANITA 2, W/B LA-210, PM R 31.91**

**TABLE 5.1.12b**  
**MAINLINE @ SANTA ANITA 2, W/B LA-210, PM R 31.91**

Time	OR TOD					
	11/14/00	12/05/00	12/07/00	12/12/00	Occ	Speed
Volume	CS	Speed	Volume	Speed	CC	Speed
6:00-6:15	1867	10.7	55	1825	9.1	64
6:15-6:30	1740	13.5	41	1874	9.8	61
6:30-6:45	1623	21.4	25	1656	18.4	30
6:45-7:00	1483	24.6	20	1666	17.3	32
				1709	17.9	32
				1709	17.9	32
7:00-7:15	1485	23.4	21	1488	18.2	27
7:15-7:30	1571	21.6	24	1600	18.0	30
7:30-7:45	1471	25.9	19	1427	22.9	22
7:45-8:00	1465	25.8	19	1390	24.7	20
				1337	23.9	19
				1337	23.9	19
8:00-8:15	1296	28.5	15	1240	25.4	16
8:15-8:30	1387	24.3	19	1112	28.6	14
8:30-8:45	1332	26.5	17	1369	20.3	22
8:45-9:00	1277	25.4	17	1292	24.0	18
				1682	15.9	36
				1682	15.9	36
Total Volume	17987		17939		18692	
Aver Occ	22.6		19.7		19.0	
Aver Speed		25		32		30

MAIN-LINE @ SANTA ANITA 2: WIB LA-210. PM R 31.91  
TABLE A5.1.12c

**MAINLINE @ SANTA ANITA 2, W/B LA-210, PM R 31.91**

**TABLE A5.1.13a**  
**MAINLINE @ HUNTINGTON, W/B LA-210, PM R. 32.76**

Time	10/24/00			10/25/00			10/31/00			11/01/00			11/07/00		
	Volume	Speed	Occupied	Volume	Speed	Occupied	Volume	Speed	Occupied	Volume	Speed	Occupied	Volume	Speed	Occupied
6:00-6:15	1697	13.1	48	1802	12.9	53	1843	15.1	45	1832	12.7	55	1786	14.7	43
6:15-6:30	1798	16.2	40	1841	17.1	39	1838	18.9	34	1752	19.2	32	1813	16.8	38
6:30-6:45	1672	20.3	29	1689	20.3	29	1680	23.7	24	1718	17.1	36	1630	19.9	29
6:45-7:00	1631	21.4	27	1527	25.1	21	1480	27.8	18	1606	17.3	34	1597	27.1	20
7:00-7:15	1546	18.7	30	1565	25.1	22	1463	27.0	19	1501	25.2	21	1568	24.3	23
7:15-7:30	1434	27.0	19	1420	26.4	19	1388	27.8	18	1398	28.8	17	1496	27.2	19
7:30-7:45	1342	28.6	16	1497	27.5	19	1393	28.1	17	1300	29.6	16	1428	28.6	17
7:45-8:00	1451	23.8	22	1320	29.2	16	1309	29.4	16	1274	29.6	15	1256	30.5	15
8:00-8:15	1251	29.4	16	1370	27.4	18	1288	30.5	15	1200	31.5	14	1259	30.3	15
8:15-8:30	1186	29.8	15	1213	30.5	14	1284	29.3	16	1257	28.9	16	1255	30.4	15
8:30-8:45	1370	26.6	18	1338	27.0	17	1338	27.8	17	1137	31.3	13	1162	31.4	13
8:45-9:00	1375	26.4	19	1375	27.5	18	1269	28.3	16	1335	28.4	16	1291	28.4	17
<b>Total Volume</b>	<b>17753</b>						<b>17593</b>			<b>17310</b>			<b>17539</b>		
<b>Aver Occ</b>	<b>23.4</b>				<b>24.7</b>			<b>26.1</b>			<b>25.0</b>			<b>25.8</b>	
<b>Aver Speed</b>			<b>26</b>			<b>25</b>			<b>22</b>			<b>26</b>		<b>23</b>	

**TABLE A5.1.13b**  
**MAINLINE @ HUNTINGTON, W/B LA-210, PM R. 32.76**

Time	11/14/ OR TOD			12/05/ OR TOD			12/07/ OR TOD			12/12/ OR TOD		
	Volume	Speed	Volume	Volume	Speed	Volume	Speed	Volume	Speed	Volume	Speed	Volume
6:00-6:15	1769	12.4	54	1737	11.7	56	1726	11.4	57	1577	16.1	34
6:15-6:30	1784	15.6	41	1811	14.8	44	1775	14.9	42	1622	20.6	27
6:30-6:45	1588	25.5	21	1708	19.2	31	1763	18.6	33	1639	23.3	24
6:45-7:00	1355	29.4	16	1590	25.2	22	1637	22.2	25	1614	25.3	22
7:00-7:15	1387	29.4	17	1244	29.2	15	1508	25.0	22	1455	26.6	19
7:15-7:30	1382	27.2	18	1528	24.8	22	1395	26.3	19	1376	27.3	18
7:30-7:45	1340	29.1	16	1308	29.1	16	1435	26.1	19	1404	27.4	18
7:45-8:00	1420	28.1	18	1304	28.0	17	1298	26.7	17	1383	28.1	18
8:00-8:15	1284	27.5	16	1272	27.3	18	1432	25.8	20	1556	23.3	23
8:15-8:30	1231	30.7	14	1165	29.7	14	1304	27.0	17	1419	24.3	21
8:30-8:45	1237	30.6	15	1266	28.5	16	1407	23.9	22	1464	23.1	22
8:45-9:00	1298	26.7	18	1248	27.7	17	1586	21.9	26	1456	20.8	25
<i>Total Volume</i>	<i>17075</i>			<i>17181</i>			<i>18266</i>			<i>17965</i>		
Aver Occ	26.0			24.6			22.5			23.9		
Aver Speed		23			26			28			23	

**TABLE A5.1.13c**  
**MAINLINE @ HUNTINGTON, W/B LA-210, PM R 32.76**

MOD TOD																		
	9/25/01			9/26/01			9/27/01			10/02/01			10/03/01			10/04/01		
Time	Volume	Speed	Occ															
6:00-6:15	1697	12.1	52	1755	13.2	48	1708	15.7	40	1718	14.2	42	1661	14.1	41	1649	11.2	57
6:15-6:30	1729	15.4	39	1781	18.6	34	1728	21.4	28	1694	14.1	44	1779	15.9	40	1725	15.7	39
6:30-6:45	1698	19.3	30	1738	22.1	27	1681	22.5	26	1597	23.5	24	1665	23.7	26	1686	20.1	29
6:45-7:00	1631	22.4	26	1558	26.2	21	1629	23.6	24	1512	27.6	20	1648	24.8	23	1678	24.9	24
7:00-7:15	1431	27.5	18	1425	28.1	18	1453	27.1	19	1442	27.5	19	1536	25.6	22	1096	31.6	12
7:15-7:30	1190	30.9	13	1303	29.3	16	1298	28.8	16	1357	29.1	17	1385	28.9	17	1164	30.2	14
7:30-7:45	1193	29.8	14	1111	32.4	12	1277	29.3	16	1271	29.6	15	1373	29.0	17	1329	28.3	17
7:45-8:00	1157	30.9	13	1217	29.4	15	1226	29.9	15	1235	28.9	16	1241	31.0	14	1501	26.2	21
8:00-8:15	986	34.1	10	1071	32.4	12	1152	30.5	13	1298	29.0	16	1213	31.0	14	1235	30.3	15
8:15-8:30	1195	29.4	14	1277	29.0	16	1305	29.1	17	1234	29.4	15	1286	29.4	16	1254	30.2	15
8:30-8:45	1223	28.8	15	1183	30.7	14	1227	29.2	16	1215	22.9	19	1174	29.9	14	1281	28.7	16
8:45-9:00	1155	30.4	14	1265	29.5	15	1226	28.9	16	644	4.2	55	1364	26.8	20	1381	26.6	20
Total Volume	<b>16225</b>			<b>16664</b>			<b>16910</b>			<b>16217</b>			<b>17325</b>			<b>16979</b>		
Aver Occ	<b>25.9</b>			<b>26.7</b>			<b>26.3</b>			<b>21</b>			<b>23.3</b>			<b>25.8</b>		
Aver Speed	<b>24</b>			<b>22</b>			<b>22</b>			<b>21</b>			<b>25</b>			<b>23</b>		

TABLE A5.1.13d

**MAINLINE @ HUNTINGTON, W/B LA-210, PM R 32.76**

**TABLE A5.1.14a**  
**MAINLINE @ MYRTLE, W/B LA-210, PM R. 33.76**

Time	10/24/00			10/25/00			10/31/00			11/01/00			11/07/00		
	Volume	Speed	Occ	Volume	Speed	Occ	Volume	Speed	Occ	Volume	Speed	Occ	Volume	Speed	Occ
6:00-6:15	1643	9.9	55	1701	10.8	52	1811	11.8	50	1777	10.8	54	1712	10.6	53
6:15-6:30	1776	14.7	40	1791	12.4	48	1819	17.1	36	1771	18.2	33	1843	17.3	36
6:30-6:45	1695	19.5	29	1635	19.8	28	1617	26.7	21	1617	24.4	23	1577	27.1	21
6:45-7:00	1499	24.0	21	1527	25.4	21	1459	27.0	18	1515	25.1	21	1451	26.5	19
7:00-7:15	1464	25.9	19	1459	26.7	19	1351	29.2	16	1443	23.6	21	1481	25.4	20
7:15-7:30	1352	27.5	17	1269	28.1	16	1304	29.9	15	1343	28.9	16	1348	28.5	16
7:30-7:45	1272	32.4	14	1423	26.2	19	1067	35.1	10	1180	31.5	14	1333	29.9	16
7:45-8:00	1199	29.4	14	1195	32.2	13	1324	28.6	16	1144	34.7	11	1196	33.4	12
8:00-8:15	1232	31.3	14	1316	27.9	16	1181	33.1	13	1019	36.3	10	1112	33.9	11
8:15-8:30	1143	32.8	12	1032	36.5	10	1245	29.2	15	1188	31.6	13	1172	32.2	13
8:30-8:45	1196	32.2	13	1264	30.5	14	1145	31.1	13	1073	34.5	11	1104	35.4	11
8:45-9:00	1303	27.4	16	1289	28.1	16	1195	30.1	14	1169	30.6	14	1227	27.6	16
<b>Total Volume</b>	<b>16774</b>						<b>16518</b>			<b>16239</b>			<b>16556</b>		
Aver Occ	<b>25.6</b>						<b>25.4</b>			<b>27.4</b>			<b>27.5</b>		
Aver Speed		<b>24</b>						<b>24</b>			<b>21</b>		<b>22</b>		<b>22</b>

**TABLE A5.1.14b**  
**MAINLINE @ MYRTLE, W/B LA-210, PM R. 33.76**

Time	11/14/00			12/05/00			12/07/00			12/12/00		
	Volume	Speed	Occupancy									
6:00-6:15	1680	10.3	54	1837	8.2	80	1758	8.0	79	1601	10.2	64
6:15-6:30	1779	14.8	40	1854	11.7	64	1815	11.9	63	1610	14.5	54
6:30-6:45	1615	22.2	24	1699	14.7	55	1751	15.9	54	1656	14.3	56
6:45-7:00	1299	32.5	14	1488	25.5	20	1670	17.7	52	1543	23.9	23
7:00-7:15	1284	32.0	14	1171	29.5	14	1440	19.6	25	1371	27.2	18
7:15-7:30	1156	34.3	12	1337	23.9	19	1281	28.2	16	1273	29.8	15
7:30-7:45	1241	30.6	14	1316	26.5	19	1325	26.9	18	1267	27.9	16
7:45-8:00	1185	30.5	14	1083	30.6	13	1205	29.0	15	1244	29.8	15
8:00-8:15	1159	34.8	12	1244	27.5	16	1308	27.9	16	1471	25.5	21
8:15-8:30	1117	36.4	11	1055	31.7	12	1111	32.6	12	1428	24.6	20
8:30-8:45	1123	33.5	12	1167	29.0	15	1313	24.9	19	1273	24.8	17
8:45-9:00	1188	31.4	13	1116	27.5	15	1449	20.2	25	1533	11.3	45
Tot Volume	<b>15826</b>			<b>16367</b>			<b>17426</b>			<b>17240</b>		
Aver Occupancy	<b>28.6</b>			<b>23.9</b>			<b>21.9</b>			<b>22.0</b>		
Aver Speed		<b>21</b>			<b>33</b>			<b>36</b>			<b>32</b>	

**MAINLINE @ MYRTLE, WIB LA-210, PM R 33.76**

MOD TOD																		
	9/25/01			9/26/01			9/27/01			10/02/01			10/03/01			10/04/01		
Time	Volume OCC	Speed OCC																
6:00-6:15	1656	9.1	61	1689	9.9	57	1716	10.3	55	1660	9.0	61	1647	9.6	56	1569	8.4	62
6:15-6:30	1597	8.7	61	1757	13.6	43	1681	12.9	43	1656	14.3	39	1732	13.3	43	1737	11.2	52
6:30-6:45	1655	14.9	38	1549	19.7	27	1573	18.5	29	1616	20.1	28	1601	19.1	29	1592	19.7	27
6:45-7:00	1543	19.9	27	1505	20.0	26	1564	17.1	31	1337	23.5	20	1528	26.0	22	1645	19.1	29
7:00-7:15	1356	22.1	21	1371	21.2	22	1417	18.8	25	1427	22.8	21	1453	24.2	21	1145	28.0	14
7:15-7:30	1199	27.7	15	1163	29.3	14	1277	27.0	17	1247	28.0	16	1248	26.2	17	993	34.7	10
7:30-7:45	1093	31.2	13	1071	31.4	12	1232	24.6	18	1267	27.2	17	1392	26.6	19	1173	30.5	14
7:45-8:00	1069	32.8	12	1139	30.4	13	1191	31.1	14	1080	32.2	12	1239	28.7	16	1355	23.3	21
8:00-8:15	927	34.2	10	1015	33.9	11	1001	34.1	11	1189	27.8	15	1143	28.5	15	1448	21.5	24
8:15-8:30	1013	32.3	11	1147	29.7	14	1123	28.9	14	1155	29.3	14	988	32.6	11	ND	ND	NA
8:30-8:45	1181	29.7	14	1140	29.1	14	1137	27.2	15	888	6.1	49	1197	21.5	21	ND	ND	NA
8:45-9:00	1088	30.6	13	1161	28.2	14	1164	28.0	15	562	3.8	53	1227	26.6	17	1248	23.6	18
Total Volume	15377			15707			16076			15084			16395			16686		
Aver Occ	24.4			24.7			23.2			20.3			23.6			22.0		
Aver Speed	28			25			26			28			26			29		

TABLE A5.1.14d

MAINLINE @ MYRTLE, W/B LA-210, PM R 33.76

**MAINLINE @ MOUNTAIN, W/B LA-210, PM R. 34.61**

**TABLE A5.1.15a**

Time	10/24/00			10/25/00			10/31/00			11/01/00			11/07/00		
	Volume	Occ	Speed												
6:00-6:15	1785	11.2	52	1782	11.3	51	1861	12.2	49	1870	12.4	48	1841	11.8	50
6:15-6:30	1897	14.0	44	1895	13.5	46	1843	17.5	34	1801	19.2	31	1890	16.1	38
6:30-6:45	1793	17.2	34	1766	18.4	31	1630	21.6	25	1679	18.9	29	1633	20.5	26
6:45-7:00	1647	19.2	28	1634	21.3	25	1507	24.3	20	1547	23.1	22	1517	23.0	22
7:00-7:15	1520	24.0	21	1592	21.6	24	1389	26.6	17	1508	21.2	23	1547	20.9	24
7:15-7:30	1448	25.5	19	1345	26.8	17	1324	27.4	17	1419	23.9	20	1455	24.3	20
7:30-7:45	1416	23.6	20	1433	25.4	19	1203	30.0	14	1292	27.0	17	1427	25.2	19
7:45-8:00	1311	27.3	17	1444	23.1	21	1503	22.5	22	1324	27.2	17	1274	26.9	16
8:00-8:15	1330	26.5	17	1374	25.3	19	1270	28.0	16	1230	29.6	14	1350	28.1	17
8:15-8:30	1275	28.6	15	1201	30.6	14	1297	27.3	16	1242	28.9	15	1257	29.2	15
8:30-8:45	1408	25.6	18	1367	24.9	19	1216	27.0	15	1214	29.3	14	1363	25.3	18
8:45-9:00	1336	26.4	17	1546	22.2	24	1403	24.2	19	1217	30.4	14	1311	26.8	17
<i>Total Volume</i>	<i>18166</i>			<i>18379</i>			<i>17446</i>			<i>17343</i>			<i>17885</i>		
Aver Occ	22.4			22.0			24.1			24.3			23.2		
Aver Speed		27			27			23			23		25		

**TABLE A5.1.15b**  
**MAINLINE @ MOUNTAIN, W/B LA-210, PM R. 34.61**

OR TOD						
	11/14/00	12/05/00	12/07/00	12/12/00	Volume	Speed
Time	Volume CC	Speed CC	Volume CC	Speed CC	Volume CC	Speed CC
6:00-6:15	1728	11.9	47	1798	9.9	59
6:15-6:30	1742	16.1	35	1799	13.2	44
6:30-6:45	1638	21.7	25	1791	16.8	35
6:45-7:00	1235	29.6	14	1618	19.7	27
7:00-7:15	1276	26.7	16	1296	23.4	18
7:15-7:30	1262	28.0	15	1324	23.2	19
7:30-7:45	1233	26.7	15	1331	23.5	19
7:45-8:00	1316	25.4	18	1327	24.0	19
					1515	21.1
					21	24
					1408	22.5
						21
8:00-8:15	1377	24.1	19	1330	22.9	20
8:15-8:30	1198	30.1	13	1259	25.7	17
8:30-8:45	1246	29.3	14	1169	27.0	15
8:45-9:00	1234	29.4	14	1398	22.7	21
					1538	19.1
					27	1529
						9.9
<b>Total Volume</b>	<b>16485</b>		<b>17440</b>		<b>18591</b>	<b>18184</b>
<b>Aver Occ</b>	<b>24.9</b>		<b>21.0</b>		<b>19.6</b>	<b>18.1</b>
<b>Aver Speed</b>		<b>22</b>		<b>28</b>		<b>31</b>
						<b>31</b>
						<b>31</b>

**TABLE A5.1.15c**  
**MAINLINE @ MOUNTAIN, W/B LA-210, PM R 34.61**

Time	MOD TOD						Speed OC	Volume OC	Speed OC	Volume OC	Speed OC	Volume OC
	9/25/01	9/26/01	9/27/01	10/02/01	10/03/01	10/04/01						
6:00-6:15	1793	9.4	62	1856	10.2	59	1871	9.9	62	1784	9.3	62
6:15-6:30	1756	9.3	62	1909	13.4	47	1858	13.7	44	1844	13.1	46
6:30-6:45	1897	13.3	47	1743	17.9	32	1681	17.9	31	1784	15.8	37
6:45-7:00	1573	20.3	25	1565	19.0	27	1607	14.6	36	1522	21.9	23
7:00-7:15	1404	22.3	23	1427	21.6	22	1628	11.6	46	1391	22.6	20
7:15-7:30	1240	24.9	17	1334	24.1	19	1429	22.0	22	1376	22.9	20
7:30-7:45	1187	26.8	15	1211	26.3	16	1296	25.0	17	1393	21.9	21
7:45-8:00	1187	26.9	15	1242	26.5	16	1347	23.5	19	1285	23.8	19
8:00-8:15	1246	25.0	17	1215	26.2	16	1104	28.4	14	1295	21.5	21
8:15-8:30	1092	29.2	13	1256	25.0	17	1333	24.7	18	1198	11.5	37
8:30-8:45	1231	26.1	16	1276	23.8	18	1329	22.0	20	1099	13.8	29
8:45-9:00	1323	24.7	18	1268	25.6	17	1183	25.5	16	951	11.7	28
<i>Total Volume</i>	<b>16929</b>		<b>17302</b>		<b>17666</b>		<b>16922</b>			<b>ND</b>		<b>ND</b>
Aver Occ	21.5		21.6		19.9		17.5			ND		ND
Aver Speed	31		28		31		32			NA		NA

**MAINLINE @ MOUNTAIN, W/B LA-210, PM R 34.61**

**TABLE A5.1.16a**  
**MAINLINE @ BUENA VISTA, W/B LA-210, PM R. 35.12**

OR TOD							
	10/24/00		10/25/00		10/31/00		11/01/00
Time	Volume	Speed	Volume	Speed	Volume	Speed	Volume
6:00-6:15	1804	10.0	57	1821	11.3	51	1932
6:15-6:30	1905	11.9	51	1815	13.5	43	1878
6:30-6:45	1642	16.1	33	1702	17.4	32	1585
6:45-7:00	1467	20.9	23	1445	22.5	21	1393
7:00-7:15	1379	22.3	20	1369	24.6	18	1252
7:15-7:30	1299	24.5	17	1191	28.6	14	1202
7:30-7:45	1176	28.8	14	1213	27.3	15	1055
7:45-8:00	1169	28.1	14	1243	23.7	17	1217
8:00-8:15	1239	25.4	16	1249	24.5	17	1159
8:15-8:30	1093	28.3	13	1043	30.6	11	1144
8:30-8:45	1276	23.6	18	1166	26.4	14	1067
8:45-9:00	1165	24.8	16	1309	21.6	21	1354
<i>Total Volume</i>	<b>16614</b>			<b>16566</b>			<b>16238</b>
Ave. Occ	22.1			22.7			23.9
Aver Speed		27			25		25

**TABLE A5.1.16b**  
**MAINLINE @ BUENA VISTA, W/B LA-210, PM R. 35.12**

Time	11/14/00			12/05/00			12/07/00			12/12/00		
	Volume OCC	Speed OCC										
6:00-6:15	1820	11.4	51	1806	9.6	60	1804	9.6	61	1653	10.9	49
6:15-6:30	1831	13.6	43	1851	12.5	48	1914	11.4	54	1668	11.9	45
6:30-6:45	1558	22.6	22	1689	14.4	38	1654	16.1	34	1535	16.5	30
6:45-7:00	1276	27.4	15	1380	21.9	21	1480	21.6	23	1404	21.4	22
7:00-7:15	1162	28.9	14	1236	25.6	17	1358	24.3	18	1283	24.8	18
7:15-7:30	1143	29.5	13	1056	29.4	13	1245	25.9	16	1117	28.6	13
7:30-7:45	1116	29.3	13	1224	24.7	17	1169	26.0	15	1255	26.2	16
7:45-8:00	1122	30.5	13	1167	23.7	16	1224	24.2	17	1193	26.3	15
8:00-8:15	1174	26.9	15	1151	24.9	16	1243	25.0	17	1291	22.7	19
8:15-8:30	1038	30.9	11	1043	28.8	13	1128	27.0	14	1418	14.3	32
8:30-8:45	1222	26.2	15	1021	27.8	12	1279	22.2	20	1453	10.1	47
8:45-9:00	1104	30.6	12	1329	22.1	21	1366	21.2	22	1472	7.3	66
<i>Total Volume</i>	<b>15566</b>			<b>15953</b>			<b>16864</b>			<b>16742</b>		
Aver OCC	<b>25.7</b>			<b>22.1</b>			<b>21.2</b>			<b>18.4</b>		
Aver Speed		<b>22</b>			<b>27</b>			<b>28</b>			<b>32</b>	

**TABLE A5.1.16c**

**MAINLINE @ BUENA VISTA, W/B LA-210, PM R 35.12**

TABLE A5.1.16d

MAINLINE @ BUENA VISTA, W/B LA-210, PM R 35.12

SWARM 1		SWARM 2b						SWARM 1/2b								
10/16/01			10/23/01			10/17/01			10/24/01			10/18/01			11/07/01	
Time	Volume	Speed	CC	Volume	Speed	CC	Volume	Speed	CC	Volume	Speed	CC	Volume	Speed	CC	
6:00-6:15	1758	9.1	62	1754	8.9	63	1701	8.9	61	1815	9.8	59	1774	9.1	63	
6:15-6:30	1846	10.4	57	1861	11.3	53	1919	10.6	58	1767	13.2	43	1836	10.8	54	
6:30-6:45	1494	20.1	24	1591	16.7	31	1478	19.9	24	1475	20.5	24	1570	15.8	32	
6:45-7:00	1482	19.9	24	1405	18.7	25	1379	21.6	21	1220	24.9	17	1314	22.9	19	
7:00-7:15	1368	19.5	23	1269	24.4	17	1362	20.9	21	1261	23.3	18	1336	22.9	19	
7:15-7:30	1230	22.9	18	1239	23.2	18	1182	26.7	15	1371	21.1	21	1169	25.6	16	
7:30-7:45	1257	22.0	19	1094	28.5	13	1192	25.5	16	1189	25.7	15	1109	26.2	14	
7:45-8:00	1076	28.5	13	1201	24.3	17	1045	29.2	12	1100	29.8	12	1148	23.8	16	
8:00-8:15	1192	24.9	16	1141	27.3	14	1150	27.5	14	1135	27.9	14	1290	20.4	21	
8:15-8:30	1183	24.9	16	1280	21.0	20	1140	26.3	15	1006	30.7	11	1028	28.5	13	
8:30-8:45	1180	24.1	17	1172	25.2	16	1076	27.1	14	1311	21.9	20	1098	25.2	16	
8:45-9:00	1317	17.9	24	1141	26.0	16	1036	28.1	13	1166	23.6	16	1091	27.0	14	
Total Volume	16383			16148			15580			15516			15763		17022	
Aver Occ		20.4			21.3			22.7			21.5			21.5		19.8
Aver Speed			28			28			27		25			28		29

**MAINLINE @ MOUNT OLIVE, W/B LA-210, PM R. 36.3**

		OR TOD				11/01/00				11/07/00			
		10/24/00		10/25/00		10/31/00		11/01/00		Volume		Speed	
Time	Volume	Occ	Speed	Occ	Speed								
6:00-6:15	1452	6.5	78	1530	7.1	75	1534	6.9	78	1551	6.8	79	74
6:15-6:30	1462	6.9	73	1602	7.8	70	1658	7.2	78	1587	7.5	73	1563
6:30-6:45	1427	12.1	40	1455	12.4	39	1465	17.7	28	1336	17.3	26	1473
6:45-7:00	1175	6.8	60	1348	23.7	20	1183	27.0	15	1270	25.1	17	1197
7:00-7:15	1301	6.5	68	1152	27.5	14	1089	28.7	13	1177	27.4	15	1197
7:15-7:30	1328	11.6	38	1114	30.1	12	1069	30.2	12	1094	29.8	13	1286
7:30-7:45	1182	23.9	17	1170	29.7	14	1106	29.7	13	1171	27.9	14	1246
7:45-8:00	1216	19.3	25	1217	26.7	15	1075	30.0	12	1073	31.0	12	1162
8:00-8:15	1266	13.4	32	1146	22.9	17	1200	22.5	19	1054	29.0	12	1077
8:15-8:30	1109	21.6	17	1300	18.1	25	1116	25.6	15	981	33.2	10	1025
8:30-8:45	1072	24.7	15	932	29.8	11	1140	25.4	16	1016	28.5	13	1100
8:45-9:00	1137	17.2	24	1204	18.1	24	1126	21.0	19	995	29.4	12	990
Total Volume	15127			15170			14761			14305			14610
Aver Occ		14.2			21.2				22.7		24.4		21.3
Aver Speed			42			31				30		28	32

**TABLE A5.1.17b**  
**MAINLINE @ MOUNT OLIVE, W/B LA-210, PM R. 36.3**

Time	11/14/00			12/05/00			12/07/00			12/12/00		
	Volume	Occ	Speed	Volume	Occ	Speed	Volume	Occ	Speed	Volume	Occ	Speed
6:00-6:15	1468	6.7	77	1477	6.8	76	1475	6.7	76	1350	7.0	66
6:15-6:30	1580	7.0	78	1569	6.9	77	1518	7.0	74	1379	7.5	62
6:30-6:45	1445	15.4	32	1488	13.9	36	1558	12.3	43	1298	14.7	29
6:45-7:00	1117	29.6	13	1313	20.2	23	1375	20.3	22	1373	16.9	28
7:00-7:15	1099	30.0	12	1173	26.3	15	1234	27.6	15	1290	19.3	23
7:15-7:30	1015	31.7	11	947	32.9	10	1185	27.8	14	1115	28.5	13
7:30-7:45	1022	31.1	12	1193	25.5	16	1087	29.6	13	1158	25.9	15
7:45-8:00	1034	30.5	12	1036	30.9	11	1122	28.2	14	1132	28.4	13
8:00-8:15	1136	25.1	16	1098	28.3	14	1151	25.0	16	1257	25.1	17
8:15-8:30	1080	30.5	13	1177	25.5	16	1285	18.7	23	1098	14.3	27
8:30-8:45	1021	29.8	13	1002	27.4	13	1129	16.4	24	1000	6.6	43
8:45-9:00	942	32.0	12	1102	27.3	14	1193	5.9	71	1036	5.4	55
<b>Total Volume</b>	<b>13059</b>											
Aver Occ	25.0			22.7			18.8			16.6		
Aver Speed		29			30			36			33	

**TABLE A5.1.17c**  
**MAINLINE @ MOUNT OLIVE, W/B LA-210, PM R 36.30**

MOD TOD																		
	9/25/01			9/26/01			9/27/01			10/02/01			10/03/01			10/04/01		
Time	Volume Occ	Speed Occ																
6:00-6:15	1385	6.4	74	1428	6.9	72	1465	6.9	73	1409	6.5	74	1442	6.7	74	1351	6.3	74
6:15-6:30	1235	5.4	78	1534	7.1	74	1505	7.1	71	1429	6.8	71	1450	6.9	71	1406	6.5	73
6:30-6:45	1549	7.6	69	1417	9.7	49	1416	14.6	34	1460	8.4	58	1450	9.7	51	1461	7.1	70
6:45-7:00	1346	16.8	27	1276	17.7	25	1079	29.0	13	1151	24.2	16	1249	24.2	18	1286	19.9	22
7:00-7:15	1217	24.6	18	1179	27.5	15	1204	27.4	15	1190	28.1	14	1218	26.4	16	1195	24.2	17
7:15-7:30	1020	28.4	12	1041	29.9	12	1226	25.7	16	1056	30.0	12	1185	26.1	15	852	33.8	8
7:30-7:45	942	30.7	10	956	33.2	10	1011	29.4	11	902	25.5	112	1081	29.5	12	881	33.2	9
7:45-8:00	979	30.5	11	926	34.4	9	1089	28.8	13	766	3.4	75	1096	28.0	13	963	31.5	10
8:00-8:15	968	32.9	10	1066	29.6	12	1082	29.6	13	1167	20.1	20	1089	29.2	13	1270	21.8	20
8:15-8:30	860	34.7	9	936	32.2	10	965	31.1	10	1001	29.7	11	1022	28.9	12	1097	27.3	14
8:30-8:45	1016	28.5	12	1046	28.3	13	1053	27.5	13	811	35.3	8	1076	27.5	13	1058	27.5	13
8:45-9:00	972	29.7	12	1001	30.0	12	1033	28.9	13	516	40.1	5	993	29.8	12	1061	27.9	13
<i>Total Volume</i>	<i>13489</i>			<i>13886</i>			<i>14128</i>			<i>12858</i>			<i>14353</i>			<i>13881</i>		
<i>Aver Occ</i>	<i>23.0</i>			<i>23.9</i>			<i>23.8</i>			<i>30</i>			<i>28</i>			<i>42</i>		
<i>Aver Speed</i>		<i>32</i>														<i>22.7</i>		<i>22.3</i>
																<i>29</i>		<i>32</i>

TABLE A5.1.17d

MAINLINE @ MOUNT OLIVE, W/B LA-210, PM R 36.30

SWARM 1				SWARM 2b				SWARM 1/2b			
10/16/01		10/23/01		10/17/01		10/24/01		10/18/01		11/07/01	
Time	Volume	Speed	CC	Volume	Speed	CC	Volume	Speed	CC	Volume	Speed
6:00-6:15	1420	6.7	73	1397	6.4	75	1368	6.3	75	1448	6.7
6:15-6:30	1431	6.5	74	1481	6.9	73	1470	7.0	71	1515	8.3
6:30-6:45	1393	9.2	51	1415	10.8	45	1463	8.9	55	1293	20.7
6:45-7:00	1237	25.7	16	1341	23.0	19	1106	26.2	14	1080	29.6
7:00-7:15	1218	26.4	16	1054	29.6	12	1274	23.3	19	1100	28.2
7:15-7:30	1190	24.7	16	1152	28.6	14	1039	29.2	12	1131	27.8
7:30-7:45	1192	26.7	16	981	31.9	10	1147	27.2	14	1144	25.8
7:45-8:00	1077	29.8	12	1112	27.9	14	1068	29.8	12	1113	29.6
Total Volume	144229	14234		13895		14230		14097		15165	
Aver Speed	20.5	23.6		23.2		24.1		23.3		29	
Speed	6.7	7.7		7.5		6.5		7.5		1537	
Volume	144229	14234		13895		14230		14097		15165	
CC	31	29		30		25		23.3		29	
OC	31	31		31		31		31		34	

**TABLE A5.1.18a**  
**MAINLINE @ IRWINDALE 1, W/B LA-210, PM R. 37.78**

Time	10/24/00			10/25/00			10/31/00			11/01/00			11/07/00		
	Volume Occ	Speed CC	Volume Occ	Speed CC	Volume Occ	Speed CC	Volume Occ	Speed CC	Volume Occ	Speed CC	Volume Occ	Speed CC	Volume Occ	Speed CC	Volume Occ
6:00-6:15	2024	15.7	48	2204	16.8	49	2098	16.6	47	2136	16.2	59	2096	16.3	48
6:15-6:30	2170	19.1	42	2228	16.5	50	2164	17.5	46	2220	15.7	53	2150	19.5	41
6:30-6:45	2096	18.6	42	2138	18.3	44	2172	20.0	40	2102	18.1	43	2096	19.7	39
6:45-7:00	1876	23.9	29	2018	19.4	39	1958	22.1	33	2050	20.6	37	2002	17.1	44
7:00-7:15	1846	23.4	29	1968	21.2	35	1814	22.5	30	1786	24.6	27	1860	20.3	34
7:15-7:30	2114	20.2	39	1938	23.4	31	1678	27.5	23	1764	25.4	26	1968	21.0	35
7:30-7:45	1964	20.7	35	1690	28.2	22	1796	25.0	27	1782	24.6	27	2090	19.5	40
7:45-8:00	1832	22.7	30	1770	23.6	28	1596	27.4	22	1726	24.7	26	2054	16.5	46
8:00-8:15	1864	19.2	36	1918	13.9	51	1794	21.6	31	1718	22.9	28	1830	12.1	56
8:15-8:30	1834	13.6	50	1674	16.9	37	1768	22.0	30	1550	26.8	22	1760	12.3	53
8:30-8:45	1690	11.1	56	1516	15.4	36	1668	15.9	39	1648	24.5	25	1550	10.8	53
8:45-9:00	1476	9.8	56	1480	11.3	49	1442	9.2	58	1610	21.9	27	1546	10.0	57
<b>Total Volume</b>	<b>22786</b>			<b>22542</b>			<b>21948</b>			<b>22092</b>			<b>23002</b>		
Aver Occ	18.2			18.7			20.6			20.6			20.6		16.3
Aver Speed		41			40			36			35		45		45

**TABLE A5.1.18b**  
**MAINLINE @ IRWINDALE 1, W/B LA-210, PM R. 37.78**

OR TOD							
11/14/00		12/05/00		12/07/00		12/12/00	
Time	Volume CC	Speed CC	Volume CC	Speed CC	Volume CC	Speed CC	Speed
6:00-6:15	2102	17.4	45	2042	16.8	45	2054
6:15-6:30	2148	18.1	44	2100	20.3	39	2060
6:30-6:45	2188	19.0	43	2168	20.7	39	2166
6:45-7:00	1934	20.5	35	2102	19.1	41	2088
7:00-7:15	1604	26.5	22	2022	20.2	37	2028
7:15-7:30	1704	26.6	24	1666	29.4	21	2150
7:30-7:45	1498	30.6	18	1568	28.1	21	1716
7:45-8:00	1630	26.1	23	1812	23.9	29	1758
8:00-8:15	1680	24.7	25	1800	23.4	29	1782
8:15-8:30	1856	23.1	30	1884	18.9	37	1706
8:30-8:45	1568	25.5	23	1622	11.7	51	1684
8:45-9:00	1594	16.3	36	1552	10.7	54	1532
<b>Total Volume</b>	<b>21506</b>			<b>22338</b>		<b>22704</b>	
Aver Occ	22.9			20.3		20.3	
Aver Speed		32			37		43
							42

MAINLINE @ IRWINDALE 1, W/B LA-210, PM R 37.78

TABLE A5.1.18d

MAINLINE @ IRWINDALE 1, W/B LA-210, PM R 37.78

SWARM 1		SWARM 2b						SWARM 1/2b										
10/16/01			10/23/01			10/17/01			10/24/01			10/18/01			11/07/01			
Time	Volume	Speed	Volume	Speed	Volume	Speed	Volume	Speed	Volume	Speed	Volume	Speed	Volume	Speed	Volume	Speed		
6:00-6:15	2108	18.0	44	2032	17.9	43	1011	9.2	41	1069	9.3	43	2136	18.5	43	2168	15.6	52
6:15-6:30	2068	19.3	40	2072	17.9	43	2104	17.5	45	2172	18.8	43	2034	18.8	41	2140	20.3	39
6:30-6:45	2070	20.3	38	2086	20.1	39	2052	19.5	39	2026	17.6	43	2012	18.5	41	2220	19.1	43
6:45-7:00	2024	20.9	36	2068	20.2	38	1994	18.1	41	1876	25.3	28	2044	20.2	38	2084	20.9	37
7:00-7:15	1982	22.2	33	1998	22.8	33	920	12.4	28	1694	27.8	23	1854	22.5	31	2020	23.8	32
7:15-7:30	1920	23.8	30	1730	26.2	25	1888	24.3	29	1666	27.1	23	1758	25.3	26	1968	21.5	34
7:30-7:45	1910	21.2	34	1714	28.4	23	1862	26.3	24	1856	25.9	27	1742	24.0	27	1704	22.7	28
7:45-8:00	1936	20.8	35	1618	27.7	22	1758	24.7	27	1760	25.9	25	1728	25.0	26	1936	18.2	40
8:00-8:15	1564	30.8	22	1616	28.1	21	1642	25.4	24	1702	24.6	26	1830	22.7	30	1926	18.0	40
8:15-8:30	1698	14.5	44	1480	32.3	20	1748	23.4	28	1746	23.2	28	1830	21.5	32	1860	14.0	49
8:30-8:45	1670	12.1	51	1616	25.1	24	1558	27.0	22	1742	22.0	30	1612	24.0	25	1610	12.5	48
8:45-9:00	1554	11.4	50	1622	22.3	27	1558	21.9	26	777	5.6	51	1558	21.4	27	1526	11.2	51
<b>Total Volume</b>	<b>22504</b>		<b>21652</b>		<b>19895</b>		<b>20086</b>		<b>22138</b>		<b>23162</b>		<b>23138</b>		<b>23162</b>		<b>41</b>	
<b>Aver Occ</b>	<b>19.6</b>		<b>24.1</b>		<b>20.8</b>		<b>21.1</b>		<b>21.9</b>		<b>33</b>		<b>33</b>		<b>33</b>		<b>18.2</b>	

**TABLE A5.1.19a**  
**MAINLINE @IRWINDALE 2 , W/B LA-210, PM R. 37.92**

Time	10/24/00				10/25/00				10/26/00				10/31/00				11/01/00				11/07/00			
	Volume	Occ	Speed	Volume	Occ	Speed	Volume	Occ	Speed	Volume	Occ	Speed	Volume	Occ	Speed	Volume	Occ	Speed	Volume	Occ	Speed	Volume	Occ	Speed
6:00-6:15	1770	15.0	41	1852	16.5	44	1651	10.7	52	1559	12.5	45	1471	12.6	42									
6:15-6:30	1879	15.1	41	1913	19.5	40	1443	9.3	52	2256	29.2	22	1425	9.6	50									
6:30-6:45	1752	19.5	34	1800	16.3	39	1310	8.5	57	2304	34.8	19	1393	10.0	48									
6:45-7:00	1675	18.7	31	1659	21.2	34	1633	23.2	27	2272	33.9	19	1475	9.6	53									
7:00-7:15	1566	20.8	29	1690	19.7	31	1353	20.0	28	1071	16.5	24	1309	9.4	48									
7:15-7:30	1789	17.9	34	1738	16.3	35	1211	20.7	17	1358	23.6	21	1268	11.8	40									
7:30-7:45	1816	16.5	36	1604	19.3	28	1332	26.5	20	1213	15.9	29	1325	12.1	37									
7:45-8:00	1610	19.1	30	1423	23.0	30	1233	20.8	20	1259	21.8	24	1388	11.4	43									
8:00-8:15	1657	14.2	38	1654	14.7	44	1085	18.8	17	1111	17.3	22	1361	7.1	64									
8:15-8:30	1621	9.7	54	1644	16.4	33	1575	24.2	22	1030	20.9	20	1393	7.8	60									
8:30-8:45	1549	9.2	55	1348	18.3	26	1286	26.6	22	1172	23.8	18	1189	6.5	61									
8:45-9:00	1342	11.2	46	1432	9.3	50	1057	11.9	40	1422	21.7	25	1157	8.1	49									
<b>Total Volume</b>	<b>20026</b>			<b>19757</b>			<b>16159</b>			<b>18027</b>			<b>16154</b>											
Aver Occ	15.6			17.5			18.4			22.7			24											
Aver Speed	39			36			32			32			24											

**TABLE A5.1.19b**  
**MAINLINE @IRWINDALE 2 , W/B LA-210, PM R. 37.92**

Time	11/14/00			12/5/00			12/7/00			12/12/00		
	Volume	Speed	Occupancy									
6:00-6:15	1671	11.2	50	1646	19.1	38	1621	9.9	55	1319	10.0	46
6:15-6:30	1293	12.2	38	1588	17.6	41	1560	10.7	49	1265	11.5	38
6:30-6:45	1484	10.0	50	1619	18.3	41	1427	11.4	43	1179	10.5	40
6:45-7:00	1333	10.4	44	1622	18.8	34	1287	10.2	44	1331	11.0	41
7:00-7:15	1211	18.0	27	1546	19.3	41	1603	18.7	30	1251	8.8	49
7:15-7:30	1331	21.8	25	1279	16.8	28	1557	20.3	40	1141	10.6	36
7:30-7:45	998	16.9	22	876	15.0	19	1292	11.3	39	1472	22.8	29
7:45-8:00	1037	18.0	22	1479	20.9	27	1298	19.1	23	1644	16.2	37
8:00-8:15	1262	20.2	24	1107	9.4	40	1207	18.4	29	1333	13.5	49
8:15-8:30	1454	20.5	33	1433	18.2	26	1448	7.1	68	1529	7.8	66
8:30-8:45	1171	18.1	24	1145	11.6	47	1011	15.2	38	1347	12.3	49
8:45-9:00	1417	18.6	38	1079	6.2	58	1119	11.6	45	1511	7.5	67
<b>Total Volume</b>	<b>15662</b>			<b>16419</b>			<b>16430</b>			<b>16322</b>		
Aver Occupancy	16.3			15.9			13.7			11.9		
Aver Speed		34			37			42			46	

MAINLINE @ IRWINDALE 2, WIB LA-210, PM R 37.92  
TABLE A5.1.19c

**MAINLINE @ IRWINDALE 2, W/B LA-210, PM R 37.92**

SWARM 1		SWARM 2b						SWARM 1/2b									
10/16/01		10/23/01			10/17/01			10/24/01			10/18/01			11/07/01			
Time	Volume CC	Speed CC															
6:00-6:15	1713	10.4	56	1700	11.2	52	1639	22.0	41	1585	22.9	44	1775	11.4	53	2147	11.7
6:15-6:30	1577	10.1	53	1716	10.6	56	1667	10.8	52	1543	9.8	53	1556	9.9	53	2003	14.0
6:30-6:45	1416	9.2	53	1540	10.4	51	1336	8.7	52	1635	10.5	53	1583	20.2	39	2056	13.0
6:45-7:00	1625	19.9	41	1536	20.4	38	1517	10.6	49	1457	18.5	35	1529	10.6	50	1873	14.8
7:00-7:15	1342	23.2	36	1461	11.7	43	1467	19.8	34	1334	18.2	31	1376	11.1	43	1863	14.5
7:15-7:30	1473	20.3	35	1426	19.0	31	1452	18.4	35	1379	18.0	33	1450	18.5	34	1825	13.1
7:30-7:45	1381	23.0	37	1325	23.1	28	1332	19.3	30	1522	19.3	39	1397	19.8	32	1635	13.4
7:45-8:00	1547	9.9	54	1435	20.7	29	1416	22.1	33	1389	19.6	32	1363	19.3	35	1802	12.8
8:00-8:15	1309	9.7	46	1416	23.1	28	1281	20.1	30	1464	20.5	31	1432	10.9	45	1813	11.7
8:15-8:30	1296	8.1	55	1292	20.9	32	1351	10.5	45	1379	10.5	45	1453	10.2	49	1743	8.9
8:30-8:45	1313	7.0	64	1464	13.0	39	1123	10.3	37	1432	13.7	36	1144	10.4	38	1550	8.1
8:45-9:00	1269	6.9	62	1311	10.9	41	1279	11.1	39	1045	20.6	58	1292	9.8	46	1480	7.7
<b>Total Volume</b>	<b>17261</b>		<b>17622</b>		<b>16850</b>		<b>17164</b>		<b>17350</b>		<b>21790</b>				<b>12.0</b>	<b>51</b>	
Aver Speed	13.1		16.3		15.3		40		41		43						

**TABLE A5.1.20a**  
**MAINLINE @ VERNON , WB LA-210, PM R. 38.87**

OR TOD							
	10/24/00		10/25/00		10/31/00		11/01/00
Time	Volume	Speed	Volume	Speed	Volume	Speed	Volume
6:00-6:15	2066	14.5	2096	16.8	2078	19.7	2174
6:15-6:30	1971	19.6	2131	16.6	1996	18.3	2096
6:30-6:45	1861	21.0	1859	20.8	29	1928	19.8
6:45-7:00	1800	23.8	25	1899	20.8	30	1808
7:00-7:15	1632	26.3	21	1830	19.4	31	1516
7:15-7:30	1835	23.4	26	1719	25.4	23	1494
7:30-7:45	1927	19.1	33	1674	25.4	22	1628
7:45-8:00	1820	18.8	33	1805	20.6	29	1778
8:00-8:15	1827	13.9	43	1528	26.0	25	1690
8:15-8:30	1767	10.9	52	1807	10.7	55	1840
8:30-8:45	1688	9.9	55	1607	9.5	55	1576
8:45-9:00	1507	9.0	55	1556	9.0	56	1494
Total Volume	21701		21511		20826		20570
Aver Occ	17.4		18.4		20.2		23.7
Aver Speed	38		38		34		27
							40
							17.1
							9.6
							55

**TABLE A5.1.20b**  
**MAINLINE @VERNON , W/B LA-210, PM R. 38.87**

Time	11/14/00			12/05/00			12/07/00			12/12/00		
	Volume	Speed	Occupancy									
6:00-6:15	2062	19.7	34	2057	15.7	43	2118	13.5	51	1961	13.7	47
6:15-6:30	2072	17.4	39	1942	17.9	36	1902	19.3	33	1740	21.7	27
6:30-6:45	1905	22.7	27	1871	20.0	31	1982	19.9	33	1715	20.9	28
6:45-7:00	1725	25.5	22	1884	19.7	32	1832	22.3	28	1779	21.3	28
7:00-7:15	1598	27.3	19	1849	20.9	29	1948	20.8	31	1819	18.0	33
7:15-7:30	1580	28.8	19	1634	23.5	23	1818	22.6	27	1862	20.5	30
7:30-7:45	1446	29.5	16	1496	24.4	21	1779	19.3	30	1743	23.2	26
7:45-8:00	1533	26.2	21	1827	16.8	37	1833	14.7	42	1975	17.1	39
8:00-8:15	1677	23.2	25	1861	15.1	42	1725	8.7	64	1715	8.6	65
8:15-8:30	1837	19.3	31	1817	11.6	51	1731	8.8	64	1765	8.8	65
8:30-8:45	1582	21.1	26	1641	8.4	64	1723	9.0	63	1720	8.8	64
8:45-9:00	1477	8.6	56	1563	8.9	60	1619	8.4	63	1720	8.7	65
<b>Total Volume</b>	<b>20544</b>			<b>21442</b>			<b>22010</b>			<b>21514</b>		
Aver Occ	22.4			16.9			15.6			15.9		
Aver Speed		28			39			44			43	

**MAINLINE @ VERNON, W/B LA-210, PM R 38.87**  
**TABLE A5.1.20c**

MOD TOD									
		9/25/01		9/26/01		9/27/01		10/02/01	
Time	Volume	Speed	Volume	Speed	Volume	Speed	Volume	Speed	10/03/01
	CC	CC	CC	CC	CC	CC	CC	CC	
6:00-6:15	1928	11.5	55	2099	13.2	52	2085	13.4	51
6:15-6:30	1672	8.5	64	1932	18.9	34	1948	17.1	37
6:30-6:45	2923	13.0	50	1777	20.3	29	1906	19.9	32
6:45-7:00	1957	18.3	35	1918	20.5	31	1833	19.1	32
7:00-7:15	1806	19.0	32	1747	18.9	30	1550	24.2	21
7:15-7:30	1644	21.7	26	1678	21.5	26	1675	21.6	26
7:30-7:45	1515	23.5	21	1582	21.3	25	1677	21.8	26
7:45-8:00	1482	24.3	22	1569	21.5	25	1731	18.2	33
8:00-8:15	1578	22.8	24	1628	20.9	27	1785	16.7	36
8:15-8:30	1581	23.2	23	1722	17.7	33	1726	14.0	41
8:30-8:45	1401	25.9	18	1507	23.2	22	1698	15.2	37
8:45-9:00	1601	21.6	27	1684	16.5	34	1551	8.8	59
<b>Total Volume</b>	<b>21088</b>			<b>20843</b>		<b>21165</b>		<b>19741</b>	
<b>Aver Occ</b>	<b>19.4</b>			<b>19.5</b>		<b>17.5</b>		<b>17.3</b>	
<b>Aver Speed</b>		<b>35</b>			<b>31</b>		<b>36</b>		<b>35</b>
									<b>38</b>
									<b>37</b>

TABLE A5.1.20d

**MAINLINE @ VERNON, W/B LA-210, PM R 38.87**

SWARM 1		SWARM 2b						SWARM 1/2b						
10/16/01		10/23/01			10/17/01			10/24/01		10/18/01		11/07/01		
Time	Volume CC	Speed CC												
6:00-6:15	2013	19.0	35	1986	16.0	41	1942	19.2	34	2054	16.0	42	2107	15.5
6:15-6:30	1859	18.5	33	1945	18.5	34	1875	19.5	32	1893	16.7	37	1850	16.8
6:30-6:45	1873	17.5	35	1891	18.7	34	1862	18.4	35	1886	17.1	37	1872	18.4
6:45-7:00	1838	19.3	32	1876	20.1	31	1890	20.9	29	1824	19.9	30	1817	20.0
7:00-7:15	1791	21.1	28	1810	19.3	32	1663	21.1	27	1521	23.6	21	1704	22.5
7:15-7:30	1677	21.5	26	1611	22.9	24	1752	22.1	26	1509	25.9	20	1603	24.0
7:30-7:45	1819	18.4	33	1671	22.4	25	1551	24.4	21	1716	21.2	27	1669	21.8
7:45-8:00	1945	18.5	35	1629	23.8	23	1769	18.4	32	1791	18.4	33	1506	25.5
8:00-8:15	1791	11.8	50	178	20.4	31	1655	20.7	27	1770	17.6	33	1882	15.1
8:15-8:30	1695	8.6	64	1609	22.0	31	1806	15.7	38	1686	20.1	29	1789	15.5
8:30-8:45	1658	9.0	61	1814	16.9	37	1713	18.6	32	1731	15.8	36	1737	12.5
8:45-9:00	1527	8.2	61	1552	8.3	61	1569	17.3	31	1552	8.1	63	1514	10.1
Total Volume	21486		19572		20957		20938			21055			22095	
Aver Occ	16.0		19.1		19.7		18.4			18.1			13.3	
Aver Speed	41		34		31		34			35			48	

**OR TOD**

**TABLE A5.6.1**  
**TRAVEL TIME (MINUTES)**

		START AT 7:30 AM								
10/24/00		Vermont	Wind 2	Wind 1	Mount Oli	Buena Vis	Moutain	Huntingt	Antila 2	Antila 1
PM	38.87	37.92	37.78	36.30	35.12	34.61	33.76	32.76	31.91	31.73
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18	1.02
Speed	26.00	34.00	39.00	38.00	17.00	19.00	17.00	*	16.00	23.00
Time (min)	1.90	0.23	2.31	2.57	1.70	2.83	3.64	2.62	0.50	2.55
Cumulative										
Travel Time (min)	1.90	2.13	4.44	7.01	8.71	11.54	15.18	17.80	16.30	20.85

		10/24/00						TRAVEL TIME		
STATION		Baldwin 1	McMillinda	Rosemead 2	Rosemead 1	Sterra MV	San Gabriel	Altadena	Lake	
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	26.82	26.14
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23	0.68	
Speed	28.00	25.00	41.00	44.00	47.00	45.00	34.00	28.00	34.00	44.00
Time (min)	0.50	1.16	0.20	0.16	0.52	1.37	0.46	2.38	1.05	
Cumulative										
Travel Time (min)	21.35	22.51	22.71	22.87	23.39	24.76	25.22	27.60	28.65	28.85

**Note:** \* indicates that the entered speed is from the next 15 minute interval.

## OR TOD

TABLE A5.6.2  
TRAVEL TIME (MINUTES)

10/25/00									
START AT 7:30 AM									
STATION	Vermont	Wind 2	Wind 1	Mount O!	Bueno V's	Mountain	Myrtle	Huntingt	S Anita 2
PM	38.87	37.92	37.78	36.30	35.12	34.61	33.76	32.76	31.91
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18
Speed	22.00	28.00	22.00	14.00	15.00	19.00	*	13.00	22.00
Time (min)	2.28	0.34	4.93	4.88	1.80	3.19	4.14	2.68	18.00
Cumulative									0.54
Travel Time (min)				2.62	7.55	12.43	14.23	17.42	24.24
									27.70

10/25/00									
STATION	Baldwin 2	Baldwin 1	Michillinda	Rossmead 2	Rossmead 1	Sierra M V	San Gabriel	Altadena	Lake
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	26.82
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23	0.68
Speed	24.00	24.00	32.00	36.00	*	32.00	25.00	27.00	34.00
Time (min)	0.55	1.37	0.25	0.21	0.84	2.08	0.52	2.38	1.03
Cumulative									45.00
Travel Time (min)	28.25	29.62	29.86	30.08	30.92	33.00	33.52	35.90	36.93
									36.93

Note: \* indicates that the entered speed is from the next 15 minute interval.

## OR TOD

TABLE A5.6.3  
TRAVEL TIME (MINUTES)

		START AT 7:30 AM									
		Wind 1	Wind 2	Vermont	Mount O!	Buena Vis	Mountain	Myrtle	Huntingt	S Anita 1	S Anita 2
PM	38.87	37.92	37.78	36.30	35.12	34.61	33.76	32.76	31.91	31.73	
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18		1.02
Speed	21.00	20.60	27.00	13.00	11.00 *	22.00	16.00	16.00	16.00	14.00	
Time (min)	2.78	0.36	4.44	5.90	1.85	2.68	3.75	3.19	0.72		3.95
Cumulative											
Travel Time (min)	2.78	3.14	7.58	13.48	15.33	18.02	21.77	24.95	25.67	29.62	

		TRAVEL TIME									
		Baldwin 1	Baldwin 2	Mitchillinda	Rosemead 1	Rosemead 2	Streets MV	San Gabriel	Alladene	E	Lake
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	26.82	26.14	
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23	0.68		
Speed	17.00 *	25.00	27.00	31.00	35.00	25.00	27.00	28.00	49.00	40.00	
Time (min)	0.63	1.46	0.29	0.22	0.80	2.08	0.52	1.92	0.92		
Cumulative											
Travel Time (min)	30.25	31.73	32.02	32.24	33.04	35.11	35.64	37.55	38.47	38.47	

Note: \* indicates that the entered speed is from the next 15 minute interval.

## OR TOD

TABLE A5.6.4  
TRAVEL TIME (MINUTES)

		START AT 7:30 AM									
11/01/00		Vermon	Irwind 2	Irwind 1	Mount Oii	Buena Vis	Moutain	Myrtle	Huntingt	S Anita 2	S Anita 1
PM	38.87	37.92	37.78	36.30	35.12	34.61	33.76	32.76	31.91	31.73	
Distance		0.95	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18	1.02
Speed		22.00	29.00	27.00	14.00	13.00	*	11.00	15.00	17.00	14.00 *
Time (min)		2.24		0.30	4.33	5.24	2.04	3.64	4.62	3.19	0.70
Cumulative											3.83
Travel Time (min)		2.24		2.54	6.87	12.11	14.15	17.79	22.41	25.60	26.29
											30.12

		11/01/00								TRAVEL TIME	
STATION		Baldwin 2	Baldwin 1	Michillinda	Rosemead 2	Rosemead 1	Sierra M V	San Gabriel	Altadena	Lake	
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	26.82	26.14	
Distance		0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23	0.68	
Speed		18.00	19.00	22.00	25.00	28.00	26.00	23.00	24.00	28.00	39.00
Time (min)		0.71	1.87	0.36	0.27	0.89	2.20	0.61	2.84	1.22	
Cumulative											
Travel Time (min)		30.83	32.71	33.06	33.33	34.22	36.43	37.04	39.88	41.10	41.10

Note: \* indicates that the entered speed is from the next 15 minute interval.

## OR TOD

**TABLE A5.6.5**  
**TRAVEL TIME (MINUTES)**

11/07/00									
START AT 7:30 AM									
STATION	Travel Time (min)								
Vermont									
PM	38.87	37.92	37.78	36.30	35.12	34.61	33.76	32.76	31.91
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18
Speed	40.00	37.00	40.00	17.00	16.00	19.00	16.00	* 15.00	15.00
Time (min)									
Cumulative									
Travel Time (min)	1.48		1.70	4.81	9.11	10.85	13.77	17.64	20.93
									21.63
									25.34

11/07/00									
STATION	Travel Time (min)								
Baldwin 1									
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	26.82
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23	0.68
Speed	18.00	20.00	20.00	24.00	28.00	23.00	*	28.00	29.00
Time (min)									
Cumulative									
Travel Time (min)	26.03	27.95	28.33	*	28.61	29.55	31.67	32.17	34.41
									35.44
									35.44

**Note:** \* indicates that the entered speed is from the next 15 minute interval.

OR TOD

TABLE A5.6.6  
TRAVEL TIME (MINUTES)

11/14/00

START AT 7:30 AM

STATION	Vermont	Irwind 2	Irwind 1	Bueno Vista	Moutain	Myrtle	Huntingt	S Antila 2	S Antila 1
PM	38.87	37.92	37.78	36.30	35.12	34.61	33.76	32.76	31.91
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18
Speed	16.00	22.00	18.00	12.00	13.00	*	18.00	18.00	17.00
Time (min)	3.00	0.42	5.92	5.66	1.97	3.19	3.75	2.76	0.60
Cumulative									2.60
Travel Time (min)	3.00		3.42	9.34	15.00	16.98	20.17	23.92	26.67
									27.27
									29.88

11/14/00

STATION	Baldwin 1	Baldwin 2	Mcchilimda	Rosemead 2	Rosemead 1	Serrra M V	San Gabrel	Akdena	Lake
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	26.82
Distance	0.22	0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23
Speed	30.00	*	22.00	22.00	25.00	27.00	23.00	24.00	26.00
Time (min)	0.51		1.75	0.36	0.28	0.96	2.30	0.58	2.42
Cumulative									1.05
Travel Time (min)	30.38		32.13	32.49	32.76	33.72	36.02	36.60	39.02
									40.06
									40.06

Note: \* indicates that the entered speed is from the next 15 minute interval.

## OR TOD

TABLE A5.6.7  
TRAVEL TIME (MINUTES)

12/05/00

START AT 7:30 AM

STATION	Vermont	Wind 2	Wind 1	Bueno VIs	Mountain	Myltrie	Huntingt	S Antilla 2	S Antilla 1
PM	38.87	37.92	37.78	36.30	35.12	34.61	33.76	32.76	31.91
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18
Speed	21.00	19.00	21.00	16.00	17.00	19.00	*	13.00	17.00
Time (min)	2.85	0.42	4.80	4.29	1.70	3.19	4.00	2.76	0.58
Cumulative									3.14
Travel Time (min)	2.85	3.27	8.07	12.36	14.06	17.25	21.25	24.01	24.59
									27.73

12/05/00

STATION	Baldwin 1	Micchilinda	Rosemead 1	Sherman M V	San Gabrie	Altadena	El Seg	Lake	Travel Time
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	26.82
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23	0.68
Speed	22.00	21.00	27.00	29.00	31.00	*	21.00	26.00	25.00
Time (min)	0.61	1.60	0.30	0.24	0.92	2.30	0.56	2.89	1.09
Cumulative									
Travel Time (min)	28.34	28.94	30.24	30.48	31.40	33.70	34.27	37.16	38.25
									38.25

Note: \* indicates that the entered speed is from the next 15 minute interval.

## OR TOD

TABLE A5.6.8  
TRAVEL TIME (MINUTES)  
12/07/00

		START AT 7:30 AM					
		Wind 1	Wind 2	Buena Vis	Moutain	Myrtle	Huntingt
STATION		Vermont					
PM	38.87	37.92	37.78	36.30	35.12	34.61	33.76
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00
Speed	30.00	39.00	26.00	13.00	15.00	19.00 *	15.00
Time (min)	1.65	0.26	4.55	5.06	1.80	3.00	3.75
Cumulative							
Travel Time (min)	1.65		1.91	6.46	11.52	13.32	16.32
						20.07	22.90
							23.47
							26.32

		TRAVEL TIME					
		III	II	I	San Gabrie	Sierra M V	Rosemead 1
STATION		Baldwin 1	Baldwin 2	Michillinda	Rosemead 2	Rosemead 1	Attraden
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24
Speed	24.00	27.00	31.00	35.00	38.00	30.00 *	29.00
Time (min)	0.52	1.32	0.25	0.20	0.71	1.83	0.47
Cumulative							
Travel Time (min)	26.84	28.16	28.42	28.61	29.32	31.15	31.62
							34.52
							35.85
							35.85

Note: \* indicates that the entered speed is from the next 15 minute interval.

**TABLE A5.6.9**  
**TRAVEL TIME (MINUTES)**  
**OR TOD**

		START AT 7:30 AM									
12/12/00		Vermont	Wind 2	Wind 1	Mount O!	Buena VIs	Moutain	Mrytle	Huntingt	S Anita 1	S Anita 2
PM	38.87	37.92	37.78	36.30	35.12	34.61	33.76	32.76	31.91	31.73	
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18		1.02
Speed	26.00	29.00	28.00	15.00	16.00	22.00 *	15.00	18.00	23.00	21.00	
Time (min)	2.07	0.29	4.13	4.57	1.61	2.76	3.84	2.49	0.49		2.31
Cumulative											
Travel Time (min)	2.07	2.37	6.50	11.07	12.68	15.43	19.07	21.56	22.05		24.36

		12/12/00						TRAVEL TIME				
STATION		Baldwin 1	Baldwin 2	Micchilinda	Rosemead 2	Rosemead 1	Santa M V	San Gabriel	Affadena	El Cajon		
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	26.82	26.14		
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24		1.23	0.68		
Speed	32.00	19.00	28.00	37.00	46.00	39.00	30.00	33.00 *	29.00	47.00		
Time (min)	0.52	1.63	0.26	0.17	0.56	1.57	0.46	2.38		1.07		
Cumulative												
Travel Time (min)	24.87	26.51	28.77	26.94	27.51	29.07	29.53	31.91	32.98	32.98		

Note: \* indicates that the entered speed is from the next 15 minute interval.

**TABLE A5.6.10**  
**TRAVEL TIME (MINUTES)**

MOD TOD		START AT 7:30 AM																	
09/25/01																			
		STATION		Wind 1		Wind 2		Mount Oii		Bueno VIs		Mountain		Huntingt		S Antia 1		S Antia 2	
PM	38.87	Vermon																	
Distance	0.95	37.92	37.78	26.30	35.12	34.61		33.76		32.76		31.91		31.73					
Speed	21	31	25	10	11	*	15	12	13	17									1.02
Time (min)	2.19	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30									*
Cumulative																			3.71
Travel Time (min)	2.19	2.49	7.57	14.31	16.66	20.44	25.24	28.64	29.26	32.97									42.31

STATION		09/25/01										TRAVEL TIME		
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	28.05	26.82				
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23						26.14
Speed	15	NA	26	34	34	32	24	27						0.68
Time (min)	0.6439	1.8732	0.28	0.2118	0.7273	1.9286	0.5647	2.203						50
Cumulative														0.9067
Travel Time (min)	33.61	35.48	35.76	35.98	36.70	38.63	39.20	41.40	42.31					42.31

Note: \* indicates that the entered speed is from the next 15 minute interval.

**TABLE A5.6.11**  
**TRAVEL TIME (MINUTES)**

**MOD TOD**

**09/26/01**

**START AT 7:30 AM**

STATION	Wind 2	Wind 1	Mount OI	Bueno Vis	Moutain	Myrtle	Huntingt	S Anita 2	S Anita 1
PM	38.87	37.92	37.78	26.30	35.12	34.61	33.76	32.79	31.91
Distance	0.96	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18
Speed	25	31	24	10	12 *	16	13	15	17 *
Time (min)	2.04	0.31	5.22	6.44	2.19	3.52	4.29	3.00	0.60
Cumulative									3.50
Travel Time (min)	1.93	2.24	7.46	13.90	16.08	19.60	23.88	26.88	27.48
									30.98

**09/26/01**

STATION	Baldwin 1	Baldwin 2	McHillinda	Rosemea 2	Rosemea 1	Sierra M V	San Gabriel	Ardena	Lake
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	26.82
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23	0.68
Speed	18	NA	23	33	29	24	32	29	38
Time (min)	0.64	1.87	0.30	0.23	0.91	1.93	0.47	2.20	0.97
Cumulative									
Travel Time (min)	31.63	33.50	33.80	34.03	34.94	36.86	37.34	39.54	40.51
									40.51

**Note:** \* indicates that the entered speed is from the next 15 minute interval

**TABLE A5.6.12**

MOD TOD							09/27/01							
START AT 7:30 AM				ARRIVED				TIME				DISTANCE		
STATION	Vermon	Wind 2	Wind 1	Mount O!	Buena Vis	Mountain	Myrtle	Huntingt	S Antilla	S Antilla 2	Time	Date	Distance	
PM	38.87	37.92	37.78	26.30	35.12	34.61	33.76	32.76	31.91	31.73				
Distance	0.95	0.14	1.48		1.18	0.51	0.85	1.00	0.85	0.18			1.02	
Speed	26	32	31	11	14	17	*	14	15	15			15	
Time (min)	1.97	0.27	4.23	5.66	1.97	3.29	4.14	3.40	0.72				4.53	
Cumulative Travel Time (min)		1.97	2.24	6.47	12.13	14.10	17.39	21.53	24.93	25.65			30.19	

**Note:** \* indicates that the entered speed is from the next 15 minute interval

**TABLE A5.6.13**  
**TRAVEL TIME (MINUTES)**

MOD TOD		START AT 7:30 AM										TRAVEL TIME	
10/02/01		STATION		Wind 1		Wind 2		Vermont		PM		Lake	
Distance	0.95	NA	0.14	1.48	1.18	0.51	0.85	Bueno Vista	Mount O'Brien	38.87	37.92	37.78	31.73
Speed	49	NA	56	12	16	21	17	Mountaineer	Wind 1	35.12	34.61	33.76	31.91
Time (min)	1.09		0.16	2.61	5.06	1.65	2.68	Wind 2	Wind 1	0.90	1.25	3.86	31.40
Cumulative Travel Time (min)								Mountain	Mountaineer	10.57	13.26	16.89	23.33
Travel Time (min)		1.09	1.25	3.86	8.92	10.57	13.26	16.89	19.73	20.27			
10/02/01		STATION		Wind 1		Wind 2		Baldwin 1		PM		Lake	
Distance	0.22	NA	0.64	0.14	0.12	0.40	0.90	Michillinda	Rosemead 1	30.71	30.49	29.85	26.14
Speed	20	NA	30	34	36	32	25	Rosemead 2	Baldwin 2	29.71	29.59	29.19	26.82
Time (min)	0.53		1.54	0.26	0.21	0.71	1.89	Baldwin 1	Michillinda	0.53	25.65	25.86	31.40
Cumulative Travel Time (min)								San Gabriel	Almadena	23.85	25.39	25.65	31.40
Travel Time (min)		23.85	25.39	25.65	25.86	26.56	28.46	28.98	30.64	31.40	31.40		

Note: \* indicates that the entered speed is from the next 15 minute interval

**TABLE A5.6.14**  
**TRAVEL TIME (MINUTES)**

**MOD TOD**

**10/03/01**

START AT 7:30 AM							
STATION		Wind 2		Wind 1		Buena VIs	
PM	38.87	37.92	37.78	26.30	35.12	34.61	33.76
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00
Speed	24	32	27	12	17	NA *	16
Time (min)	2.04	0.28	4.55	4.88	1.85	3.45	4.00
Cumulative Travel Time (min)	2.04	2.32	6.88	11.76	13.62	17.07	21.07
						24.26	24.86
							28.26

**10/03/01**

TRAVEL TIME							
STATION		Wind 1		Rosemead 1		San Gabriel	
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24
Speed	18	NA *	27	36	34	NA	29
Time (min)	0.59	1.71	0.27	0.21	0.76	1.71	0.46
Cumulative Travel Time (min)	28.84	30.55	30.82	31.02	31.79	33.50	33.96
						35.62	36.43
							36.43

Note: \* indicates that the entered speed is from the next 15 minute interval

TABLE A5.6.15

## TRAVEL TIME (MINUTES)

MOD TOD

10/04/01

START AT 7:30 AM

STATION	Vermont	Wind 2			Buena Vista	Moutain	Myle	Unitngt	S Antila 2	S Antila 1
PM	38.87	37.92	37.78	26.30	35.12	34.61	33.76	32.76	31.91	31.73
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18	1.02
Speed	21	25	15	9 *	16	NA	21	21	47	41
Time (min)	2.48	0.42	7.40	5.66	1.65	2.76	2.86	1.50	0.25	1.65
Cumulative Travel Time (min)	2.48	2.90	10.30	15.96	17.62	20.37	23.23	24.73	24.98	26.63

10/04/01

STATION	Baldwin 1	Rosemead 1	Sierra M V	San Gabriele	Atascadero	Hill	Lake	TRAVEL TIME
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23
Speed	33	NA	33	39	36	33 *	30	44
Time (min)	0.40	1.16	0.23	0.19	0.70	1.71	0.48	1.99
Cumulative Travel Time (min)	27.03	28.20	28.43	28.62	29.32	31.03	31.51	33.50
								34.43
								34.43

Note: \* indicates that the entered speed is from the next 15 minutes interval

**TABLE A5.6.16**  
**TRAVEL TIME (MINUTES)**

**SWARM 1**

**10/16/01**

**START AT 7:30 AM**

STATION	Vemon	Twind 2	Twind 1	Moutt O!	Bueno Vis	Moutain	Myrtle	Huntingt	S Anita 2	S Anita 1
PM	38.87	37.92	37.78	26.30	35.12	34.61	33.76	32.76	31.91	31.73
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18	1.02
Speed	33	37	34	16	19	20	*	14	16	21
Time (min)	1.63	0.24	3.55	4.05	1.57	3.00	4.00	2.76	0.55	3.31
Cumulative										
Travel Time (min)	1.63	1.87	5.42	9.46	11.03	14.03	18.03	20.79	21.34	24.65

**10/16/01**

STATION	Baldwin 2	Baldwin 1	Rosemea 2	Rosemea 1	Siera M V	San Gabrie	Affadena	Hill	Lake	TRAVEL TIME
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	26.82	26.14
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23		0.68
Speed	19	NA	38	46	40	35	28	30	*	55
Time (min)	0.46	1.35	0.20	0.17	0.64	1.71	0.50	1.74	0.78	49
Cumulative										
Travel Time (min)	25.12	26.46	26.66	26.83	27.47	29.18	29.68	31.42	32.20	32.20

**Note:** \* indicates that the entered speed is from the next 15 minute interval

**TABLE A5.6.17**  
**TRAVEL TIME (MINUTES)**

**SWARM 2b**

**10/17/01**

**START AT 7:30 AM**

STATION	Vemont	Wind 2	Wind 1	Buena Vis	Moutain	Myrtle	Hunting	Antia 2	Antia 1
PM	38.87	37.92	37.78	26.30	35.12	34.61	33.76	32.76	31.91
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18
Speed	21	30	24	14	16	17 *	14	18	22
Time (min)	2.24	0.31	4.67	4.72	1.85	3.29	3.75	2.55	0.51
Cumulative									2.91
Travel Time (min)	2.24	2.55	7.22	11.94	13.80	17.09	20.84	23.39	23.90
									26.82

**10/17/01**

STATION	Baldwin 1	Baldwin 2	Michillinda	Rosemea 1	Rosemea 2	Sierra M V	San Gabrel	Atadena	III	Lake
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	26.82	26.14
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23	0.68	
Speed	22	23	29	39	35 *	NA	27	31	48	48
Time (min)	0.59	1.48	0.25	0.19	0.77	1.74	0.50	1.87	0.85	
Cumulative										
Travel Time (min)	27.40	28.88	29.13	29.32	30.10	31.84	32.34	34.20	35.05	35.05

**Note:** \* Indicates that the entered speed is from the next 15 minute interval.

SWARM 1/2b

**TABLE A5.6.18**  
**TRAVEL TIME (MINUTES)**

		START AT 7:30 AM							
		10/18/01			10/18/01				
STATION		Vermont	Irwind 2	Irwind 1	Bueno VIs	Mountain	Mtaine	Traveling	Traveling
PM	38.87	37.92	37.78	26.30	35.12	34.61	33.76	32.76	31.91
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18
Speed	25	32	27	12	14	*	15	17	27
Time (min)	2.00	0.28	4.55	5.45	1.80	2.91	3.75	2.32	0.45
Cumulative									2.60
Travel Time (min)	2.00	2.28	6.84	12.28	14.08	17.00	20.75	23.07	23.52
									26.12

		TRAVEL TIME							
		10/18/01			10/18/01				
STATION		Baldwin 2	Baldwin 1	Michillinda	Rosemea 2	Rosemea 1	Sierra M V	San Gabriel	Allendale
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	26.82
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23	0.68
Speed	26	27	36	43	39	NA	*	24	44
Time (min)	0.50	1.22	0.21	0.18	0.76	1.71	0.55	2.05	0.90
Cumulative									
Travel Time (min)	26.62	27.84	28.05	28.23	28.99	30.70	31.26	33.31	34.20
									34.20

Note: \* indicates that the entered speed is from the next 15 minute interval.

**TABLE A5.6.19**  
**TRAVEL TIME (MINUTES)**

**SWARM 1**

**10/23/01**

**START AT 7:30 AM**

STATION	Vermont	Wind 2	Wind 1	Mount Oii	Bueno Vis	Moutain	Myrtle	Huntingt	S Anita 2	S Anita 1
PM	38.87	37.92	37.78	26.30	35.12	34.61	33.76	32.76	31.91	31.73
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18	1.02
Speed	25.00	28.00	23.00	10.00	13.00 *	21.00	13.00	13.00	19.00	17.00 *
Time (min)	2.15	0.33	5.38	6.16	1.80	3.00	4.62	3.19	0.60	2.45
Cumulative										
Travel Time (min)	2.15	2.48	7.86	14.02	15.82	18.82	23.43	26.62	27.22	29.67

**10/23/01**

STATION	Baldwin 2	Baldwin 1	Michillinda	Rosemea 2	Rosemea 1	Sierra M V	San Gabriel	Altadena	Lake	III
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	26.82	26.14
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23	1.23	0.68
Speed	33	31	37	42	40	NA	27	28	37	43
Time (min)	0.41	1.13	0.21	0.18	0.72	1.61	0.52	2.27	1.02	
Cumulative										
Travel Time (min)	30.08	31.21	31.42	31.60	32.32	33.93	34.45	36.72	37.74	37.74

**Note:** \* indicates that the entered speed is from the next 15 minute interval.

## SWARM 2b

TABLE A5.6.20  
TRAVEL TIME (MINUTES)

		START AT 7:30 AM									
		10/24/01					10/24/01				
STATION		Wind 1	Wind 2	Wind 3	Wind 4	Wind 5	Wind 6	Wind 7	Wind 8	Wind 9	Wind 10
PM	38.87	37.92	37.78	26.30	35.12	34.61	33.76	32.76	31.91	31.73	S Anita 1
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18		
Speed	27	39	27	16	15	*	12	11	23	40	1.02
Time (min)	1.73	0.25	4.13	4.57	1.70		3.09	5.22	3.00	0.34	2.07
Cumulative											
Travel Time (min)	1.73	1.98	6.11	10.68	12.38	15.47	20.69	23.69	24.03	26.11	

		TRAVEL TIME									
		10/24/01					10/24/01				
STATION		Mitchillinda	Rosemea 2	Rosemea 1	Sierra M V	San Gabref	Alladene	Huntingt	Myrtle	Bueno VIs	Mount Oii
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	26.82	26.14	Lake
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23			
Speed	19	22	34	40	37	*	26	28	44	46	
Time (min)	0.64	1.37	0.23	0.19	0.73	1.96	0.53	2.05	0.91		
Cumulative											
Travel Time (min)	26.75	28.12	28.35	28.54	29.26	31.23	31.76	33.81	34.72	34.72	

Note: \* indicates that the entered speed is from the next 15 minute interval.

**SWARM 1/2b**

**TABLE A5.6.21**  
**TRAVEL TIME (MINUTES)**

		START AT 7:30 AM								
		Vermont	Wind 2	Wind 1	Bueno VIs	Mountain	Myrtle	Huntingt	S Antila 2	S Antila 1
PM	38.87	37.92	37.78	26.30	35.12	34.61	33.76	32.76	31.91	31.73
Distance	0.95	0.14	1.48	1.18	0.51	0.85	1.00	0.85	0.18	1.02
Speed	58	41	28	13	16	21	20	*	19	26
Time (min)	1.15	0.24	4.33	4.88	1.65	2.49	3.08	1.96	0.37	1.94
Cumulative Travel Time (min)	1.15	1.39	5.73	10.61	12.26	14.75	17.83	19.79	20.15	22.10

		TRAVEL TIME								
		Baldwin 1	Rosemead 1	Rosemead 2	Sierra M V	San Gabriel	Altadena	Hill	Lake	
PM	30.71	30.49	29.85	29.71	29.59	29.19	28.29	28.05	26.82	26.14
Distance	0.22	0.64	0.14	0.12	0.40	0.90	0.24	1.23	0.68	
Speed	37	33	NA	50	47	NA	41	35	42	46
Time (min)	0.38	0.93	0.20	0.15	0.55	1.23	0.38	1.92	0.93	
Cumulative Travel Time (min)	22.47	23.40	23.60	23.75	24.30	25.52	25.90	27.82	28.75	28.75

Note: \* indicates that the entered speed is from the next 15 minute interval